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Fifth Biennial Report

STATE OF LOUISIANA

Wild Life and Fisheries Commission

1952 - 1953

From the beginning (*North Louisiana*) . . . . .

BIENNIAL REPORT

Louisiana

Wild Life and Fisheries Commission

1952-53

Published by
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1954

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Director L. D. Young, Jr.

Assistant Directors Albert A. Sikes and W. S. (Bill) Werlla who also serve as purchasing agent and revenue supervisor, respectively.

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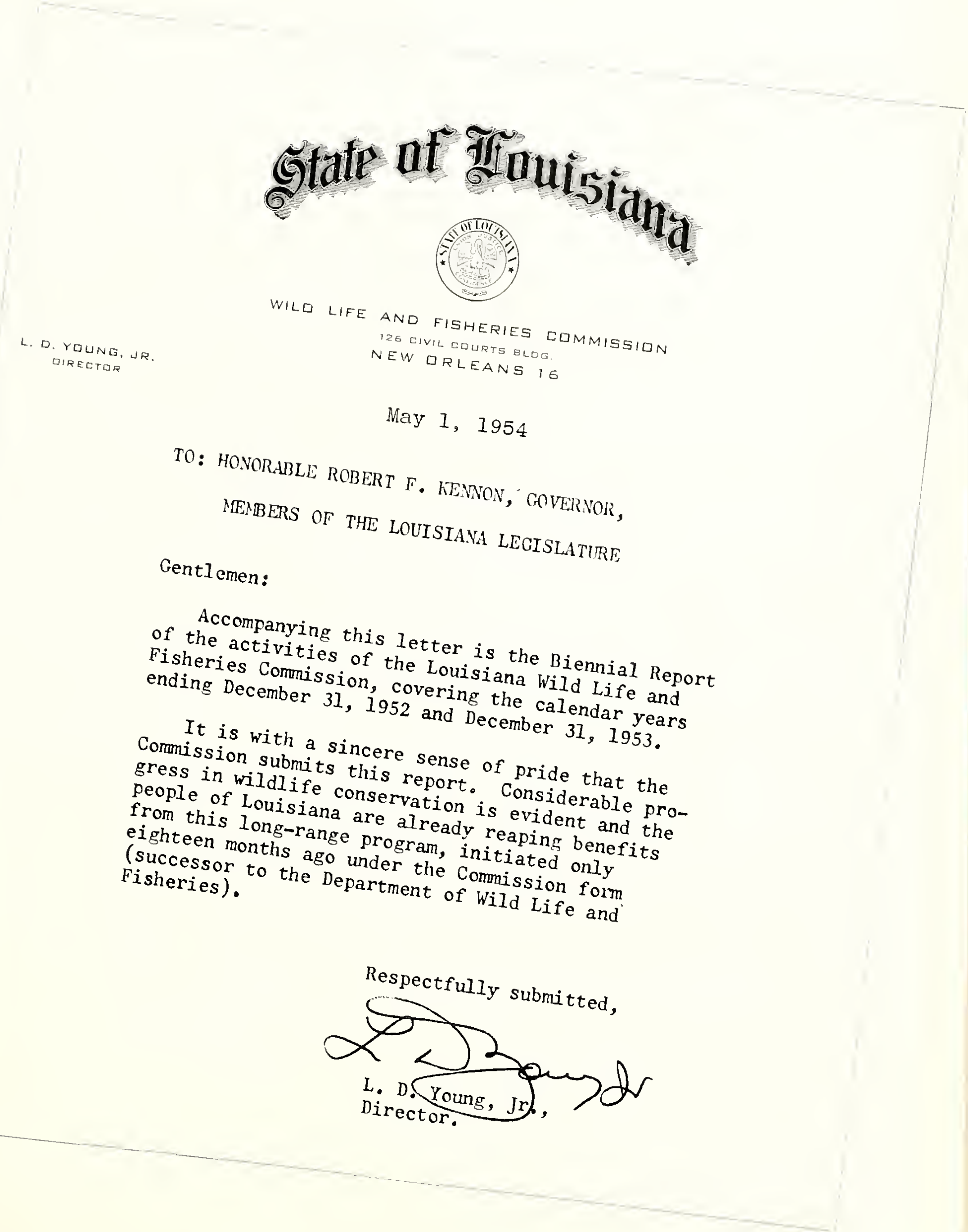

State of Louisiana

WILD LIFE AND FISHERIES COMMISSION
126 CIVIL COURTS BLDG.
NEW ORLEANS 16

L. D. YOUNG, JR.
DIRECTOR

May 1, 1954

TO: HONORABLE ROBERT F. KENNON, GOVERNOR,
MEMBERS OF THE LOUISIANA LEGISLATURE

Gentlemen:

Accompanying this letter is the Biennial Report of the activities of the Louisiana Wild Life and Fisheries Commission, covering the calendar years ending December 31, 1952 and December 31, 1953.

It is with a sincere sense of pride that the Commission submits this report. Considerable progress in wildlife conservation is evident and the people of Louisiana are already reaping benefits from this long-range program, initiated only eighteen months ago under the Commission form (successor to the Department of Wild Life and Fisheries).

Respectfully submitted,

L. D. Young, Jr.,
Director.

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Division of

Administration

L. D. Young, Jr., Director

When the Commission form of administration of wild life and fisheries resources of Louisiana came into being a little more than a year ago, there was considerable speculation as to whether or not the affairs of this important department in Louisiana's governmental structure would profit advantageously from this type of board control.

It was generally conceded that time alone would tell. Now after some sixteen months we have conclusive evidence that this form of administration has and will continue to be successful and beneficial in Louisiana's conservation program.

. . . conclusive evidence

A complete reorganization of the department has been effected and the heads of the various divisions are now settled down to the job of coordinating their activities in such a way that we can move ahead in an effort for the restoration, preservation and protection of Louisiana's bountiful wildlife resources.

The members of our Commission have given generously of their time and we have profited by their enthusiastic and experienced guidance. The Commission sets general policies and has assumed the responsibilities formerly handled by a single administrator.

All the department's activities are now based on what are considered sound biological facts and procedures. In some cases changes in the approach to many of the conservation activities in Louisiana have been contrary to ideas which have developed in the public minds as the years have passed. For instance, one of the earliest actions of the Commission was the discontinuance of the quail hatcheries program. It was found that of the thousands and thousands of quail raised and distributed throughout the state at a tremendous outlay of tax monies that only a 5.6 per cent survival of these banded birds can be accounted for.

Attorney Warren M. Simon

Every division within the Department has an ambitious program and we are giving our technical people a free hand to establish and carry out their projects along generally organized sound practices.

Considerable attention has been given to the commercial phase of our fisheries and the newly formed Seafoods Division is concerning itself with plans that shall elevate Louisiana even higher in its top bracket recognition among the states as a producer of commercial seafoods. This division has accomplished much in its short existence and one of the outstanding achievements occurred when the chief of this division brought about the acquisition of the Sabine pass lighthouse property as a transfer from the Federal Government to the State of Louisiana. This gives Louisiana a permanent installation at a point where a port of entry can be established and rounds out a full coast-wide state-owned operational set up. This

Thousands of mallards over the rice fields in the Jennings area.

year will witness an all-time high in shrimp production with an estimated 100 million pounds anticipated. The menhaden industry, while in its infancy, is rapidly becoming an outstanding part of our commercial fisheries industry.

Eight big mallards and all is well, says the American.

The fur industry, while at its lowest ebb in all history, has a brighter future, we believe. Careful attention is being given to this important industrial segment which has meant so much to the economy of our coastal area.

Oyster production has also suffered because of the ecological changes brought about in the past years—some by nature, many by man.

An extensive research program is planned to give us a true picture of what can be done to aid Louisiana's oyster production. We must get fresh water back into our oyster producing beds. Just how to accomplish this will be one of the major aims of our Oyster and Water Bottoms Division.

It is conservatively said that 100,000 people in the state of Louisiana earn their livelihood directly from our commercial fisheries. This does not include the hundreds of thousands who benefit from the sale of equipment, fuel, supplies and commodities to this important part of Louisiana's industrial development.

Perhaps no single division of our department is closer to the public as a whole than our Fish and Game Division. We realize that hundreds of thousands of people turn to our fields and woodlands and streams for recreation throughout the year. We know that Louisiana at one time was a veritable paradise for the hunter and fisherman. We believe that this wonderful state still ranks at the top when considered on a year round basis. We know that as industrial encroachment came, our wildlife decreased. The falling of our forests brought about the destruction of habitat for our squirrel; as lands were cleared and placed into agricultural acreage the natural habitat of our rabbits, deer and other game quadrupeds suffered. Quail habitat has become almost extinct in many of our parishes. The personnel of our Fish and Game Division certainly cannot accomplish miracles, but we do believe that in time their efforts will bear marked results. We are determined that every phase of Louisiana's conservation picture will be given close scrutiny and attention. To this end we have made extensive plans for the development of Rockefeller Game Preserve property with special emphasis for migratory waterfowl habitat development. Likewise, a concerted effort is being made to provide public shooting grounds throughout the state within the financial reach of every person who desires to participate in Louisiana's outdoor sports.

A Seabee hovers over speedboat La Crevette in Lake Pontchartrain

We have maintained a close contact with the general public through our Division of Education and Publicity. Speakers from our staff have appeared before hundreds of clubs and thousands have heard Louisiana's conservation story. We are certainly proud of our magazine, THE CONSERVATIONIST, which has been acclaimed throughout America as one of the nation's best prepared, most informative and most attractive publications. The circulation of this magazine, which goes free to those who request it, exceeds 44,000 and if the volume of requests continues as at present, before the end of 1954 it will be reaching 55,000 to 65,000 of our people. Through our Education and Publicity Division we believe that the future of conservation in Louisiana can be safeguarded by the attitudes of the youngsters who are in our schools today. We have inaugurated an educational program which is reaching thousands of school children and which will be expanded as rapidly as our finances and manpower will permit.

It would be impossible in the space alloted in this report to tell you of the physical properties of this department. As you read the report of the various divisions, I am sure that you will understand more fully the scope of the Commission and its many and varied responsibilities.

When we began our administration of the affairs of this Department we found a lack of equipment in many divisions. This was especially true in our enforcement section. We went about securing equipment as rapidly as our finances would permit and today every ranger in the field has at least one boat and trailer and most of them possess outboard motors. We have standardized our equipment at a savings of hundreds of dollars in purchase price and cost of maintenance. Aluminum hulls have been purchased, assuring several extra years of useful life with practically no upkeep cost.

Many of the people have looked upon our work as consisting mainly of law enforcement. We are proud of our law enforcement program and its accomplishments. We are not proud of the

Routine business being outlined by Director L. D. Young, Jr.

←

The seven-member agency out in the field to study refuge problems at State Wildlife, Rockefeller and Marsh Island.

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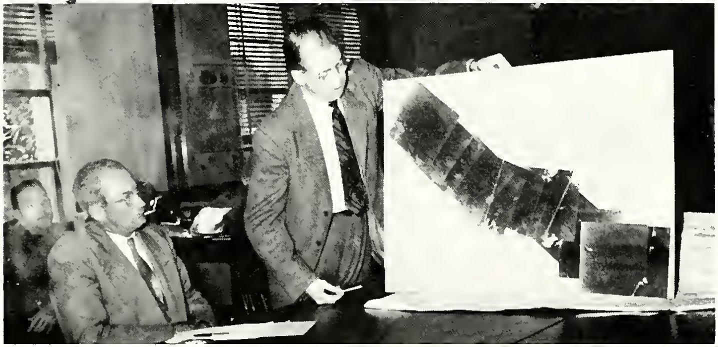

A sand and gravel company representative requests permission to take sand and gravel from one of Louisiana's stream beds.

←

It's not all work for the Commission. A seafood luncheon brightens a day in the field for the group.

→

fact that during 1953 we had to make 4,000 fish and game, sport and commercial cases for violations of Louisiana laws. The making of a record in arrests totals was only incidental to the objective we have in mind. Our main idea was to make all Louisiana game and fish law conscious. At the outset the Commission members realized that in order to have proper enforcement of our regulations it was necessary to have a high type man in our law enforcement unit. This could only be obtained by offering a more attractive salary and one of the first actions of the new board was to approve a minimum salary of $200 per month. This minimum is now $230. At the same time all new game rangers were placed on a six-month probationary period. During this six months new men are expected to adapt themselves to their new duties and become familiar with the necessities that their jobs entail. If they measure up they then become permanent members of our law enforcement staff. Every member of this group has been uniformed and two short training courses have aided in familiarizing them with the laws of Louisiana and enforcement procedures. We will enlarge our training program and are looking forward to the time when all our men will spend several weeks becoming more familiar with their duties and opportunities as members of our enforcement division.

Pollution is a major concern of the Louisiana Wild Life and Fisheries Commission. Considerable progress has been made in this direction, but we have hardly scratched the surface in this work. Unfortunately stream pollution is something that cannot be eliminated overnight. We are resolved, however, and we have been able to convince many industrial operators of the necessity of controlling their waste and we hope to convince everyone that this is an imperative necessity. In the long run what we cannot obtain by persuasion through cooperation of the offending operators, we shall endeavor to accomplish our purposes by resorting to all legal means at our disposal.

We have given much consideration to the reorganization of our Administrative Division. We have set up centralized purchasing and careful planning for the procurement of all our needs has resulted in saving of hundreds of dollars for the state. We are now intensifying our revenue collecting efforts and paying close attention to our accounting activities. Added emphasis has been placed upon the collection of revenues and every source of income reflects an increase this year over the previous year. It is true that sufficient monies are actually collected by this department to pay all operational costs thereby eliminating the necessity of drawing any monies from the general fund.

Another serious menace is that of the water hyacinths. Certainly the hyacinths and other aquatic growths have a tremendous bearing on our commercial and sports fishing. There are, however, other factors which should be taken into consideration when we think of Louisiana and its ever increasing hyacinth problem. Because of the importance of keeping our rivers and lakes open to provide navigation, irrigation and because of the importance of our streams in Louisiana's agriculture and cattle industries we believe that other state agencies should share the responsibilities of relieving Louisiana of one of its major enemies—the beautiful blooming but deathly detrimental hyacinth.

We have very ambitious plans for our department. Our Commission has placed before us a challenging goal and objectives point directly to a sound conservation program for a state which rightfully belongs at the top when one thinks of hunting, fishing and commercial activities.

You must realize that none of these things can be accomplished overnight. It will be a long, tedious and trying job. In doing all this we will require the help of every person in the state. We have been fortunate in acquiring good men in key positions in the Wild Life and Fisheries Commission to help us in this work. But we must all bear in mind, that when we won the fight for the creation of this new Commission to supplant the old one-man commissioner type administration, we won a great battle but in reality we have only started the war. If we are to win the war also, and assure a future of our natural wildlife resources, we will need the added strength and push of every man's and every woman's shoulder to the wheel.

We thank every person in Louisiana for the assistance and cooperation so freely extended us in the past year. We hope to merit a continuation of that support by giving Louisiana the best conservation program possible.

Plankton samples are taken by a Tulane scientist.

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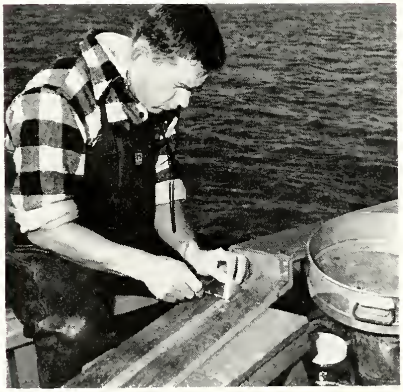
Water turbidity is measured with a Secchi disk.

Fathometer is checked by boat skipper.



Tulane professor measures and takes scale samples from a fish.

Water salinity and temperature are taken by a Tulane graduate student on Lake Pontchartrain.

→

Division of

Commercial Seafoods

Robert L. Eddy, Jr., Chief

. . . investigations needed

This is the first report of the Commercial Seafoods Division and covers the calendar year of 1953 only. The division was activated late in November of 1952 but did not begin actual operation until February of 1953.

The program under which the Commercial Seafoods Division operates was rather broadly stated in section 458 of the Louisiana statutes annotated RS:56-458: "This part of the sub-part states that one-half of all funds collected by the Oyster Division derived from the sales or grants of the right or privilege to take shells or shell deposits from the shell reefs of this state under authority of RS:56:450 and 56:451 shall be deposited in a special account by the department, and shall be dedicated to the administration and enforcement of the commercial seafood laws and to the construction, purchase, maintenance and upkeep of property and equipment used in connection therewith."

With this statement of the intent of the law, it became necessary to plan an organization which would carry out the will of the legislature. A great deal of research and investigation was necessary in order to build a structure which would be of immediate practical use and still be flexible enough so that expanded efforts and improved methods could easily be adopted as the need for expansion and improvement arose.

The operating plan eventually devised was broken down into three general categories: The administrative section, to provide the necessary overall supervision of the division's activities; the biological section, to insure accurate and intensive investigation; and the statistical research section, to accumulate a file of prior knowledge for the use of the biological section and to keep accurate statistics as they were obtained by that section.

Crabbing is an industry in Louisiana. Here, one method of catching the blue crab, by netting, is shown.

It soon became apparent, when these three sections had swung into operation, that two additional activities should be started—an exploratory fishing and gear development section, and an industrial services section. The first of these was needed to facilitate the marine investigations being made by the biological section and to experiment with new and undeveloped gear. This double program had the effect of getting two jobs done at the same time. The industrial service section was needed to transmit to the fishermen of the state the results of the investigations made by the biological section, the statistical research section, and the exploratory fishing and gear development section.

Now just passing its first birthday, the Commercial Seafoods Division can factually report that its program as originally presented to the Commission in March, 1953 is operating as planned.

Advisory Council Plans

A suggestion was made early in the year that there was a possibility that the Louisiana fisheries would provide a great opportunity for a number of marine scientists to study and report to the Commission their ideas about what should or should not be done along conservation lines for the future of the industry in Louisiana. A number of leading authorities in the field of marine biology were approached with the suggestion that they form an advisory council to the Commission. They were told that the positions would be purely honorary, that their reward for services rendered the state would be the broadening of their own knowledge of their profession through the study of our fisheries problems at first hand. The response was gratifying in the extreme: Every one of the scientists asked accepted the invitation. The new council held its initial meeting in New Orleans at a most opportune time—during the height of the Lake Pontchartrain discussion.

The Fisheries Advisory Council consists of Mr. John F. Dequine, of Florida; Dr. R. W. Eschmeyer, of Washington, D.C.; Dr. Gordon Gunter, of Texas; Dr. Carl Hubbs, of California; Dr. C. Robert Lunz, of South Carolina, and Dr. Edward C. Raney, of New York.

Jack Dequine

John F. Dequine has been chief fisheries biologist for the Florida Game and Fresh Water Fish Commission since 1946. Graduating from the University of Maine in 1939 with a degree in wildlife conservation, he went to the U.S. Forest Service and worked in New Jersey and New Hampshire until 1940. Two years with the New Jersey Fish and Game Commission followed, and he then went to Trinidad and Haiti until 1944. On his return to the United States, Mr. Dequine joined the North Carolina Wildlife Resources Commission and from there became superintendent of fisheries in the state of Kentucky. This position he held until he assumed his present duties in Florida.

Mr. Dequine has published numerous papers and articles on fishery management and controlled fisheries. He has been a contributor to many fishery publications and to several technical periodicals. He is a past president of the Southern Division of the American Fisheries Society and a member of the Executive Committee. Among the scientific societies to which he belongs are the North American Wildlife Society and the Florida Academy of Sciences.

Dr. R. W. Eschmeyer

Dr. R. W. Eschmeyer is executive vice-president of the Sports Fishing Institute of Washington, D.C. He is a native of Ohio, having graduated from Heidelberg College, and he received both his master's and his doctor's degree from the University of Michigan. His entire training was in fish conservation.

For eight years he was associated with the Michigan Institute of Research at Ann Arbor, where he was in charge of the maintenance survey program. For the following 12 years he was in charge of fisheries work with TVA and received such wide recognition that his studies were written up in TIME, THE SATURDAY EVENING POST and other popular magazines. He has been noted for his sport fishing viewpoint and was responsible for the discarding of the closed seasons on TVA waters.

Since 1950 Dr. Eschmeyer has been executive vice-president of the Sports Fishing Institute, which is an organization dedicated to improve sport fishing. He has emphasized that fact-finding and fish conservation education are the most important factors of a good, sound program. He is the author of some 50 technical papers, numerous popular articles appearing in outdoor magazines, and 12 books on conservation written for children.

Dr. Gordon Gunter

Dr. Gordon Gunter, who now resides in Texas, is a native Louisianian. He was born and reared in Goldonna (Natchitoches Parish), took his B.A. degree from Northwestern State College, and his master's and doctor's degree from the University of Texas. For two years he was with the U.S. Bureau of Fisheries—now the U.S. Fish and Wildlife Service—during the shrimp investigation on Louisiana's coast in 1931-33. In 1934 he came to the Louisiana Department of Conservation on a scholarship to Louisiana State University to study river shrimp in the Mississippi. He returned to the U.S. Bureau of Fisheries in 1935, doing oyster work, and then went as a private consultant to oyster fishermen on the Texas Coast in 1936 and 1937. Following that, Gunter was called to the National Forests of California in 1938 to conduct investigations of Debris Fisheries Survey work on salmon and steelhead.

The following year he joined the Texas Game, Fish and Oyster Commission as a marine biologist, and there he stayed until 1944. Then, with the Institute of Marine Science of the University of Texas, he went on leave for one year—1945, after which he joined the University of Miami in 1946 as a professor of zoology. During 1948, he was a senior marine biologist for the Scripps Institute of Oceanography, University of California.

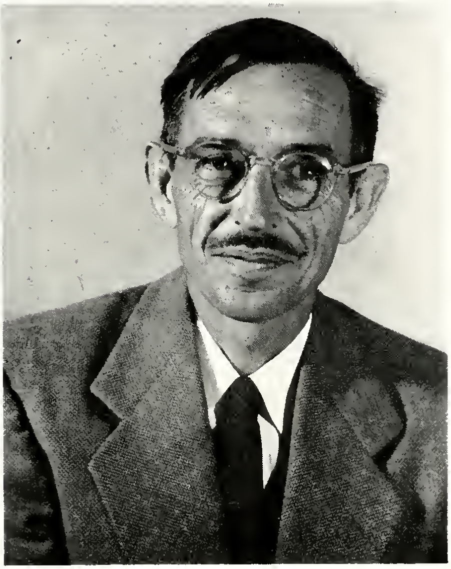
Dr. Carl L. Hubbs

Dr. Carl L. Hubbs, presently professor of biology at the Scripps Institute of Oceanography, La Jolla, California, is internationally known in the marine fisheries fields of research and biology. He obtained his master's degree from Stanford, then went to Michigan for his doctorate in zoology. He has taught at Michigan and at Scripps.

A world traveler and authority, Dr. Hubbs has been consultant to the U.S. Bureau of Fisheries in Utah, California, Wisconsin, Iowa and Michigan; abroad he has been to Hawaii, East

Asia, Guatemala, Cuba, and Java—and quite recently, to Europe and England.

His publications are legion. They cover the subjects of ichthyology, fishery biology, ecology, marine mammals, physiography and other related fields. Dr. Hubbs is a member of many distinguished scientific and research societies and has held office in many of them.



Dr. G. Robert Lunz

Dr. G. Robert Lunz is presently the director of Bears Bluff Laboratories, at Wadmalaw Island, South Carolina. A graduate of the College of Charleston, South Carolina, he received both his bachelor's and master's degrees in science from that institution. Following his graduation in 1932, he was associated with the Charleston Museum as the Curator of Crustacea, later serving as a member of their directing committee. From 1936 to 1942, Dr. Lunz acted as a consulting biologist for the Corps of Engineers, U.S. War Department; in addition, he served the U.S. Navy in 1938 and 1939 as a special investigator for their Bureau of Ships, and was a member of the Spazoni and Hartford expedition in the West Indies in 1938. In 1940 he became consulting biologist to the Florida Inland Navy District; in 1943 he became a member of the South Carolina Planning Board; and in 1949-50 was a member of the Texas A & M Research Foundation.

Dr. Lunz was appointed by the governor of South Carolina to the Atlantic States Marine Fisheries Commission in 1949 and is still a member of that commission. He received the Jefferson award for outstanding research in 1941 and became a fellow of the American Association for the Advancement of Science in 1952.

Among the research grants received by Dr. Lunz were the South Carolina Academy of Science in 1940-41 and '47, and the Charleston Education Scientific Foundation in 1946. He received a fellowship from the Guggenheim Foundation in 1949. He is a member of a number of scientific associations, among them the South Carolina Academy of Sciences, the American Association for the Advancement of Science and the National Shell Fisheries Association.

Dr. Lunz has 41 publications to his credit, his subjects covering a wide array of marine biology topics, with special emphasis placed on the commercial seafood industry.

Dr. Edward C. Raney

Dr. Edward C. Raney, of Cornell University in New York, received his doctor's degree from Cornell in 1938, having received his master's from the same institution in 1935. His graduate work at Cornell was done in the fields of fishery biology, aquatic biology and ichthyology. During the war, Dr. Raney served as a lieutenant commander in the United States Navy on active duty from 1942 to 1945. In 1948 he served as an ichthyologist for the United States National Museum, and while there he worked on the identification of the fishes taken at Bikini during the atom bomb explosions. He has also worked as a fishery biologist for the New York State Conservation Department. In 1953 he was a fishery research biologist for the U.S. Fish and Wildlife Service, and was also service coordinator of the federal state striped bass program on the Atlantic coast. Apart from his present duties at Cornell, Dr. Raney serves as a research associate for the Edmond Niles Huyck Preserve of Rensselaerville, New York.

Dr. Raney is a member of the American Society Ichthyologists and Herpetologists and was formerly secretary to that body. He is also with the American Society of Zoologists, Washington Academy of Scientists, American Fisheries Society and the American Wildlife Institute.

He is the author of 74 scientific papers and has been the co-author of others together with Dr. Carl Hubbs, a member of the advisory council, and Dr. Royal D. Suttkus, chief investigator for Tulane University.

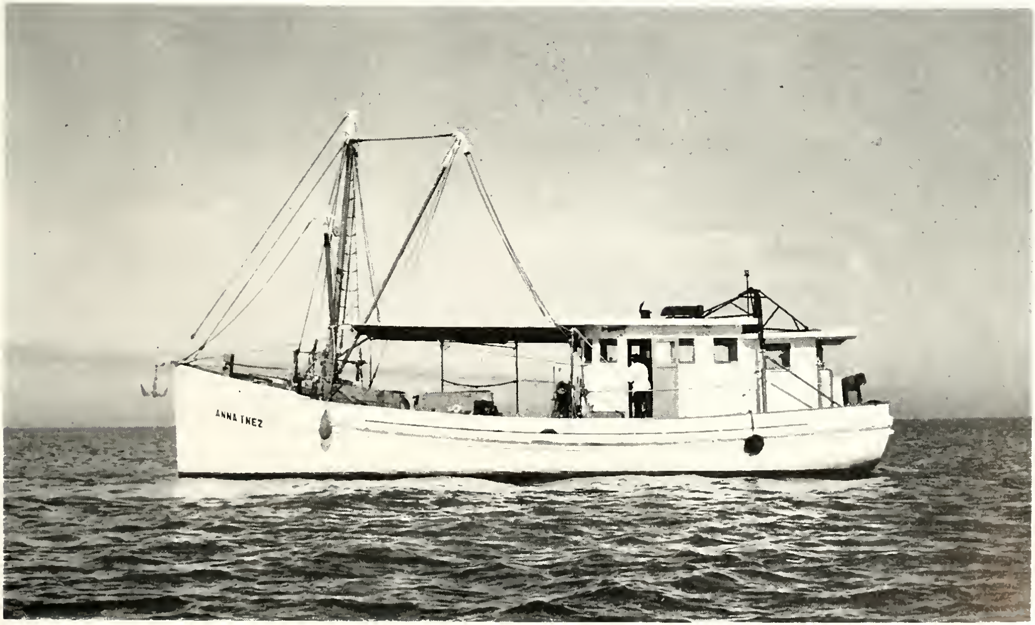
As the foregoing biographical reports show, we have been very fortunate in finding six outstanding men of science, all willing to contribute their time and knowledge for the advancement of commercial fisheries in our state.

It is striking to note that before the initial meeting of the advisory council was held, each of the scientists already knew by reputation every one of his fellow council members; moreover, each had cooperated with each of the others at one time or another in some phase of his work. Now that they are functioning as a council, it is expected that their exchange of correspondence, and their comments at the annual meeting—at which time reports and surveys are presented them for discussion and comment—will add tremendously to the total of our knowledge on the subject of Louisiana's waters in relation to her commercial fisheries.

Industrial Services Section

This section is the link between the other sections of the Commercial Seafoods Division and

Robert Lee Eddy, Jr., division chief, discusses activities with Charles Murphy (left), industrial services section leader, and Biologist Percy Viosca.



The trawler, ANNA INEZ, has been equipped for research and exploratory fishing throughout the Gulf of Mexico the industry of commercial seafoods itself. It is the responsibility of the industrial research section to publish monthly reports and special investigation reports conducted by the scientific investigating crews, operate an information service for the use of the seafood industry and other interested persons, furnish information on statistical, economic and technical matters for use in news releases and on radio and television programs, and to record, maintain and analyze all reports and surveys obtained from outside sources relating to the seafood industry of Louisiana.

This particular section was necessary if the commercial fishermen of the state were to secure the facts obtained by the ecological research section. The first problem was deciding what would best serve the industry at the very outset of the division's program. It was learned that no printed list of fish dealers existed in this—or any other—state. For that reason, the Fish Dealers' Directory, which has now been sent to every dealer in the state and the 5,000 potential buyers of fish products, was published. The preparation of this list entailed a tremendous amount of research in the files of the Commission license department and in the telephone books of every city and town in Louisiana. At the present time there are some towns whose telephone exchanges are not affiliated with Southern Bell. It was somewhat more difficult to obtain these particular numbers, but later issues of the directory will certainly include all available telephone numbers for use by the industry.

The second program carried out by the industrial services section was the institution of a monthly report of information beneficial to the industry. This monthly bulletin will shortly be sent to all captains and owners of fishing vessels in the state, as well as to all of Louisiana's seafood dealers. It is planned to include in this monthly publication the highlights of industrial developments and an abstract of the data obtained from the scientists in preceding months.

One of the three new Lyman boats recently purchased for survey work.

Delicious stuffed crabs ready for oven.

There will be one section devoted to the practical fishery research and gear development. This particular section will include not only the gear which has been tested by the exploratory gear section, but also reports of all types of gear which have been tested in other states and in foreign countries.

Electronic devices are more and more becoming required equipment for fishing vessels all over the world, and in Louisiana as well. A high percentage of our fishing fleet is so equipped. It is no longer unusual to see a vessel equipped with radar, sonar, fathometers and direction finding equipment. These are now basic requirements when a new vessel goes to sea, and the companies manufacturing them are constantly revising and improving their products. It will be the job of the industrial services section to keep the industry up-to-date on reports of new electronic equipment and of improvements to the existing manufactured articles.

In order to obtain information used by the industrial services section, it is essential to work

Sabine Lighthouse—acquired from the Federal Government at no cost to Commission.

closely with federal agencies whose responsibility extends into the waters of the state. Among these federal agencies are the Coast and Geodetic Survey, the Coast Guard, the U.S. Engineers, and the U.S. Weather Bureau. We have received cooperation from each of these units and have extended them our cooperation in turn.

Coast and Geodetic Survey Office

The United States Coast and Geodetic Survey Office, which is a branch of the U.S. Coast Guard Service, is charged with the responsibility of preparing charts used by vessels for navigation purposes. In New Orleans, this office is under the direction of Commander Chovan. When the Commercial Seafoods Division first began operations, a number of conferences were held in Commander Chovan's office, in order to outline in detail a complete and mutually beneficial program. We have received much up-to-date information from his office, and in turn we have referred to him any data which we have acquired in waters that would not normally be surveyed by the C & G office for a lengthy period of time. In doing so, we help this office keep its charts current.

With the use of electronic measuring devices on the ANNA INEZ, we shall be in a position to send copies of our charts to the Coast and Geodetic Survey, thus maintaining an even closer relationship with that office.

U. S. Coast Guard

The several divisions of the U.S. Coast Guard have worked very closely with the Commercial Seafoods Division, enabling us to establish a program aimed directly at greater safety for our fishermen on the navigable waters of the state.

Early in the summer, when the Lake Pontchartrain program was discussed, it was found that the part of the plan involving marking off Lake Pontchartrain would entail the setting out of marking buoys. We took our problem to the Coast Guard, and they immediately offered their facilities, to the extent of offering to supply the markers and set them out. If the state had had to carry out this work, the cost involved would have been quite high. As it turned out, this particular work proved unnecessary at the particular time. The Coast Guard assured us, however, that should a similar problem arise, they would be ready and willing to help us carry out our program.

U. S. Engineers' Work

Of all the agencies operating in the state of Louisiana, our citizens are probably more familiar with the work of the U.S. Engineers than of any other federal agency. This is easily understood when we realize that the engineer's responsibilities involve every aquatic area in the state —and there are hundreds. The greatest problem, of course, is their flood control program involving the mighty Mississippi and its tributaries.

A visit to their engineering division, when the Commercial Seafoods Division began operation, found them most anxious to do everything possible to assist us in getting up a sound and systematic program which would be beneficial to the fisheries. Over a period of years they have

Catfish leads the $4,000,000 freshwater fishing industry and trotlining is the favorite method used.

maintained a section devoted entirely to accurate data on the ebb and flow of the tides, flow of the rivers, hydrographic investigations, etc. All of this information was freely offered to the division, and during the past few months we have received from the engineers copies of charts dating as far back as 1898, for the use of our biological section.

The program's plan for the future, involving hydrographic surveys, salinity records and tide data will be on a more cooperative basis, and we shall make use of the data obtained from permanent stations set up by the Engineers, in turn forwarding them all information received from our mobile unit, the ANNA INEZ.

U. S. Weather Bureau

The United States Weather Bureau is another branch of the federal government which has been cooperative in exchanging information with the Commercial Seafoods Division. Information and charts essential to the safe operation of our vessels, together with information dating back a number of years concerning tides and wind velocities, have been made available to the division.

A great deal of data was necessary in our biological survey of Lake Pontchartrain. The entire facilities of the Weather Bureau were thrown open to our office. A clerk was dispatched to the office where he was able to copy the material so essentially needed by our biological section.

Sabine Pass Lighthouse

During the past few months, this division was charged with the job of trying to obtain title to the Sabine Pass Lighthouse, located at the southwestern boundary of the state, where the Sabine River flows into the Gulf. The lighthouse facility, under the direction of the U.S. Coast Guard, had operated at that spot for many years. Last year it was declared surplus, and its disposition was given to the real property section of the Real Property Disposal Office, General Services Administration, in Dallas, Texas.

One of Louisiana's universities had been offered this facility, and on a priority basis, educational institutions had first claim to any surplus property. They could not avail themselves of the offer, however, and the property was then available to the state or territories involved in educational or conservation work. An effort was made by a sportsmen's group in Texas to obtain the property for use as a private club. Our application was duly considered, and after some time we were advised that we could acquire this particular property for the use of the Commission.

The title was taken in December of 1953. The state now has another port of entry at its southwest boundary, coinciding with its port of entry at Grand Pass.

The physical property itself consists of the Sabine Pass Lighthouse Reservation. For the commercial fishermen of southwest Louisiana, this harbor will provide an emergency landing in the event of sudden squalls or other adverse weather conditions. A superintendent will be on the property at all times, and complete telephone and radio-telephone facilities are being installed, making it possible to keep in touch with both fishing craft and our headquarters 24 hours a day.

Ecological Research Section

Percy Viosca, Jr., Fishery Research Ecologist

Why Ecological Research? Fishes, shrimps, crabs and other aquatic species are renewable resources. Heretofore, these crops have been considered as a sort of bonus of nature and harvested by methods of spoliation without consideration of possible maximum yields. There have been attempts at conservation by restrictive methods, but, for the most part, these have not been based on pertinent biological facts for the reason that environmental requirements and population dynamics of the species in question are as yet little understood.

Coincident with increasing human and domestic animal populations, and increased land use for agriculture, the acreage available for the production of natural crops has been reduced proportionately. This has resulted in increased pressure on the fisheries and the take per man-day-effort has decreased while the cost has mounted. Harmful and useless restrictive legislation must, therefore, be abolished, and methods must be developed for increasing the production of economically important species.

Proving grounds must be provided for the practical application of dynamic methods of conservation and the utilization of nature's aquatic crops at levels of maximum values. This divsion must be properly equipped to gather basic ecological knowledge, to assemble many bits of knowledge already bought and paid for by other agencies, to evaluate and integrate this knowledge, and to apply the findings for the benefit of the fisheries.

Taking a plankton sample in Lake Pontchartrain while aboard the research vessel, Anna Inez.

The Research Plan. With the above objectives in mind, an ecological research plan, with emphasis on applied values, was formulated during the weeks following activation of this section on February 2, 1953. Fields of inquiry were divided for convenience into physical, chemical and biological, but all investigations would be conducted concurrently. Zones of activity would be primarily in the coastal environments, with supporting studies in freshwater areas from which the former derive their nutrient materials. Field investigations would be supported by laboratory confirmation.

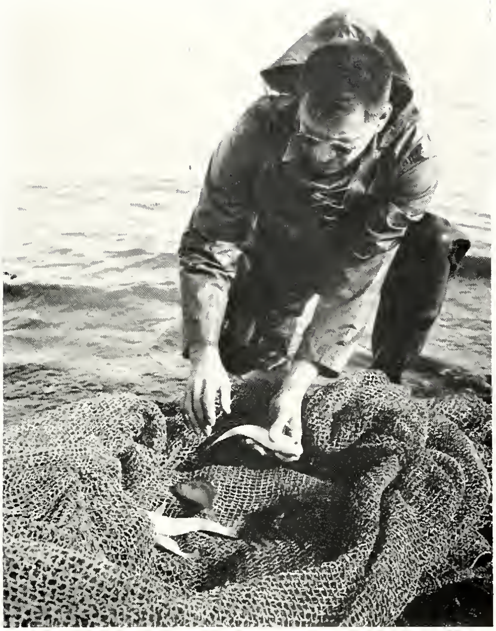
No attempt would be made to duplicate the work of other agencies (federal, state, institutional or private), it being part of the plan to assemble pertinent information from such sources. The data would be evaluated by this section and integrated into a coordinated whole, always with a view to determination of factors which limit productivity on the one hand and favor expanding populations on the other. It is believed that coordinated effort will be a short cut to the formulation of intelligent management policies for the fisheries industries.

Physical studies would include assembly and evaluation of hydrographic and climatological data, including pertinent information on tides, wind currents, wave action, calms, storm cycles, color, turbidity, light penetration, density and other physical properties which affect aquatic life.

Chemical studies would include: 1. Assembly of geochemical data with emphasis on the sources of nutrients and other substances which have a bearing on the potential productivity of aquatic environments. 2. Chemical analyses of the aquatic habitats and bottom sediments with a view to determination of transformations and cycles into which these nutrients enter, and their seasonal variations. 3. Analyses of important aquatic organisms with a view to determination of nutritional requirements. 4. Evaluation and integration of the data.

Biological studies would lay stress on the species of economic importance and their population dynamics. This would necessitate studies of food organisms, feeding habits, food chain sequences and growth rates; periods of activity and dormancy, movements and migrations; breeding seasons, spawning and mating activities; the effects of predation, disease and parasitism; the efforts of man-made changes in the environments; determination of standing crops, potential yields and actual harvests, and the evaluation and integration of the biological data.

Institutional and other Research Units. In furtherance of the plan and in order to take advantage of academic know-how, ecological research units were to be established in the universities of the state. Tulane University began a series of activities on June 5 under the direction of Dr. Royal Suttkus. This work centers on an ecological study of Lake Pontchartrain and was approved at the June meeting of the Commission.



Adverse weather conditions mean nothing to scientists in search of knowledge.

Bi-monthly reports are being received with regularity and are being evaluated and integrated into the overall research program of this section.

A similar program is being formulated for Louisiana State University by Dr. Richard J. Russel, dean of the graduate department of that institution. This will be activated early in 1954 and will be known as the Coastal Studies Institute. Its activities will center in the Grand Isle-Barataria Bay area.

The results of studies being undertaken by Scripps Institution of Oceanography in the Breton Island and Mississippi Delta areas have been tendered by project director, Dr. F. P. Shepard (American Petroleum Institute Research Project 51). These will be integrated into our program wherever pertinent.

The Sewerage and Water Board of New Orleans and the Freeport Sulphur Company have tendered analyses of Mississippi River water. Other cooperating agencies are the Weather Bureau, the U. S. Coast Guard, the U. S. Engineers and the U. S. Coast and Geodetic Survey.

Advisory Panel. This panel was created by the chief of this division for the purpose of advising on our research program and in the field of fishery management. Its members, all internationally known, were recommended by your biologist. At their initial meetings on July 21-22, all expressed satisfaction at the investigations planned and at the efforts of the Board of Commissioners to establish a sound fish conservation program for Louisiana, and all gave sound, constructive advice.

Other Activities. A radio program, "Fish Tales", was inaugurated on February 5 and has run weekly on WJMR and WRCM, New Orleans. Timely topics and important biological facts concerning the various species concerned in the commercial fisheries are given in interview form, placing proper emphasis upon the importance of the commercial fisheries in the State's economy.

Your biologist represented this Commission at the technical sessions of the Gulf States Marine Fisheries Commission at their semi-annual meetings held at Mobile, Alabama, March 16-17, and at Tampa, Florida, October 14-16. He was a speaker at the L. S. U. indoctrination courses for rangers on February 11, Louisiana Academy of Sciences at Natchitoches on April 10-12, and at various clubs throughout the state. He attended the conventions of the National Shellfisheries Association in New Orleans on June 22-25, and of the American Fisheries Society in Milwaukee on September 15-19.

The work of this section entailed a large amount of reading and library study in order to make available and bring up to date a catalog of basic ecological information which would save much time and avoid duplication of effort in our research program.

The following articles were published by your biologist during the calendar year of 1953:

"Observations on the Life History and Habits of the Lake Shrimp," Louisiana CONSERVATIONIST, January 1953.

"Life History and Habits of the Red Swamp Crawfish," Louisiana CONSERVATIONIST, March 1953.

"About Crabs," Louisiana CONSERVATIONIST, October 1953.

"Growth Rates of Black Basses and Crappie in an Impoundment of Northwestern Louisiana," Volume 82 (1952), Trans. Am. Fish. Soc. 1953.

Division of

Education and Publicity

John Blanchard, Chief

. . . sincere conservation

Much has been said about the "new era in conservation" which began with the inauguration of the Louisiana Wild Life and Fisheries Commission seven-member board in late 1952. With this new era must come a broad educational and good-will program, such as the one now in progress by this division. For the welfare of the general public, the people must understand the efforts of this Commission and the young must be taught to conserve and protect. It is with this in mind that we started the Youth Education program.

School Program First

For the first time in Louisiana conservation history, wildlife is being taught in the public schools of the state—with the consent and good wishes of the Louisiana Department of Education. Junior Wildlife clubs have been organized in south and central Louisiana by two lecturers, the latter of which began activities the last of 1953. It is our sincere hope to extend this much heralded program throughout the state when new staff members can be secured. Youths are taught bird and fish identification, how to recognize poisonous and non-poisonous snakes, how to create farm game habitats, gun safety, migration of many wild creatures, both furred and feathered. They are taught the whys and wherefores of game laws and what they may expect from the entire wildlife program. Nothing has created more interest among the youngsters since the invention of the blackboard.

Four pelicans are ready for shipment to the St. James Park, London, England, to replace the four Texas birds which died of tapeworms. Present for the occasion are the two Commission assistant directors, British Consul Allan David Frances and Audubon Park Supt. George Douglas. This publicity stunt brought LOOK magazine staffers here to tell the story which received international attention

To this division is delegated many routine and special activities which concern the promotion of conservation of Louisiana's natural resources insofar as wildlife and fisheries are concerned. In order to do this we must have a working knowledge of the activities and aims of every division within the commission realm. The Education and Publicity Division is, above all, the clearing house for all types of information sought by the peoples of this state and out-of-state individuals, bureaus and institutions. By answering the many queries which come to this office, we are able to acquaint non-residents and natives alike with the abundantly rich natural resources which are possessed by this Pelican state.

The favorable public sentiment being created

Education-Publicist Phillips prepares to show an educational movie to one of his 44 junior clubs

throughout Louisiana with respect to wildlife and fisheries is merely a "mirror of progress" which is evident to everyone in this diversified coastal state. This can be attributed, largely, to the public relations contacts made by this division—with luncheon clubs, sportsmen's clubs, civic and service leagues, church and school groups, garden clubs and other various organizations.

Highly Regarded Magazine

This division publishes the *Louisiana* CONSERVATIONIST which is highly regarded throughout the nation, by other commissions, national publications and the general public. The 10-months'-of-the-year publication is generously illustrated with excellent photographs, drawings and art work.

Currently the magazine mailing list is being revised. The need arose before the circulation hit the current mark of approximately 45 thousand. In reworking the list we found, that with each card returned, more and more people who wanted their names added. With every renewal came one to four new additions; however, duplicates were deleted and those who failed to return the request cards were removed. With an average readership of four persons (same as the national newspaper poll), there are approximately 200,000 readers of the CONSERVATIONIST; however, we feel that more than a quarter-million see the popular publication monthly because of the manner of distribution.

We feel that the magazine is in competition with "paid" publications and the CONSERVATIONIST must be "the best" if it serves its rightful purpose.

In addition to the popular magazine, it is our obligation to publish the biennial report every two years. This might be called the "bible" of the Wild Life and Fisheries Commission and is distributed to each member of the state legislature, every school in Louisiana, wildlife groups, all state officials, other fish and game commissions, and to everyone interested in any phase of Louisiana's wildlife.

The report contains a wealth of biological data, resumes of the activities of each division,

Some of the requests to continue mailing the Louisiana CONSERVATIONIST as the list is revised

Arthur Rozas, transferred from the enforcement division, and Charles D. Phillips, Jr., leader in the youth education movement, plan their program to include schools in 18 parishes in south Louisiana and part of the central portion of the state. When finances permit, the program will be extended statewide.

license sales, revenue derived, arrests, fines and the hopes and aims of the entire department. It aids in answering many queries received by this state agency.

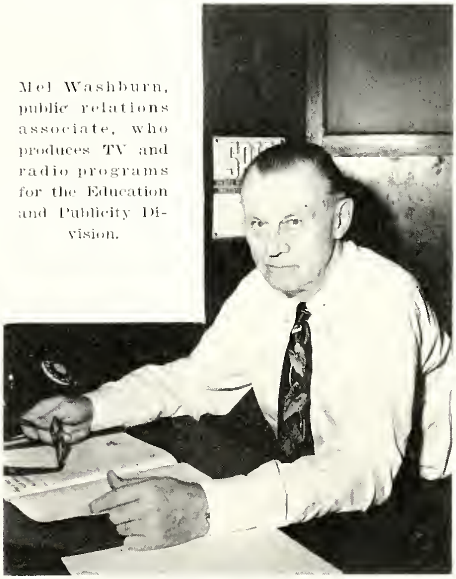
Regular news releases of routine matters, special events and the dissemination of all newsworthy material emanate from this office—on a straightforward statement of fact basis, only.

The Conservationist editor samples some of the mallard shooting about which he has written so much.

Magazines Receive Aid

National magazines have asked for and received our aid in securing information and photographs of Louisiana's outdoor activities—hunting, fishing (sport and commercial), fur industry, oyster industry, mineral development and others. During 1953 we aided The Saturday Evening Post, Field and Stream, Look, Sports Afield, Collier's, National Geographic, Fisherman, Southern Fisherman, Life, Hunting and Fishing, Esquire, and Coastal Sportsman.

Louisiana's fish and game potentialities have been shown throughout the nation by our films on television and in theatres. We have been able to provide out-of-state groups with movies from our library in an attempt to enhance our conservation program.



Mel Washburn, public relations associate, who produces TV and radio programs for the Education and Publicity Division.

Small booklets or pamphlets must be widely distributed to school children, youth organizations and others on the further method of educating the general public on the conservation education scope undertaken in 1953. Booklets currently available include a three-color brochure depicting and explaining the value of the commercial fishing industry—fresh and saltwater fish; oysters and shrimp; biennial reports of yesteryear; Wild Ducks; Poisonous Snakes, Plants and Black Widow Spiders of Louisiana; Common Birds

LOOK magazine writer extreme left and photographer extreme right dining aboard the ZORIC, Commission boat, while here to secure information and photos for national magazine.

←

Photographer Bill Shrout of SATURDAY EVENING POST photographs night life on Grand Isle for Louisiana story.

→

George X. Sands here to photograph and write migratory waterfowl story for a national magazine.

of Louisiana; Digests of Laws Pertaining to Sport Fishing, Hunting, Trapping, Oysters, Commercial Fishing; Junior Wildlife Conservation Clubs; Present Status of the Wild Turkey In Louisiana, and other smaller pamphlets.

Own Television Program

The Division of Education and Publicity has its own television show in operation and a second is planned in Baton Rouge. Many of the films shown on TV are made by division cameramen. Eventually, the show may be kinescoped and viewed over all stations in Louisiana. "Live" programs, such as roundtables, consume about one-half the television time and movies in the film library are also used to great advantage.

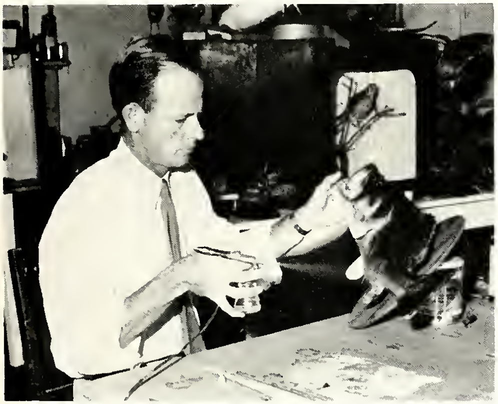
Only One of Its Kind

Louisiana is the only state in the nation which has a wildlife museum, operated exclusively by a wildlife agency. The museum, located at 751 Chartres St., New Orleans, is operated by this division. In it may be found more than 3,000 specimens and exhibits of fish and game existing from the south Louisiana marshes through the uplands of north Louisiana. New exhibits are added to the present collection which is nationally acclaimed.

The building, because it is state-owned, cuts down the overall operation budget. Utility bills

Some of the 56 films, available free of charge to the general public, are inspected before shipment to schools, churches, civic, service, veterans, Scouting and wildlife groups. The loan library is housed at the museum.

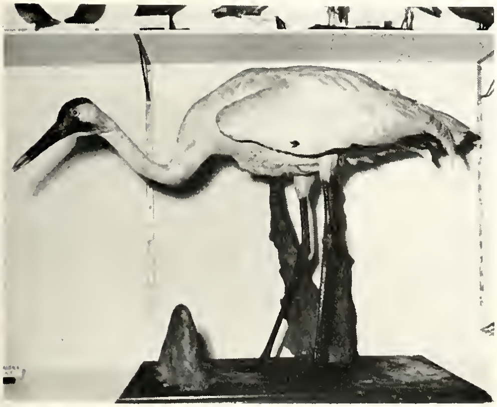
Located in the museum is a movie theatre which has a seating capacity of 200 where motion pictures are shown, free of charge, almost daily, to school classes, civic groups and other organizations, and groups transient or belonging to the city and state. More than 250,000 persons yearly visit this attractive house of exhibits.



Museum Curator J. Edouard Morgan puts the finishing touches to a largemouth bass for exhibit in the wildlife museum at 751 Chartres St., New Orleans. More than 3,000 exhibits are on display

The construction and maintenance of wildlife exhibits that are shown throughout the state are an important phase of the educational pro- are paid by the state museum and the wildlife commission.

gram. These portable displays are in great demand by conventions, clubs and kindred assemblies, as well as by all of the state's fairs and



This rare whooping crane may be seen in the wildlife museum at 751 Chartres St., New Orleans.

festivals. Our wildlife museum is open seven days each week and has become one of the major tourist attractions in the famous Vieux Carre of New Orleans.

During the past biennium many hundreds of stories have originated in this division which pertain to conservation education, official proclamations, orders of the Commission and a biweekly column for the state's 130 newspapers and 40 radio stations. Our relations with press and radio have been most cordial and they have come to depend on us for information concerning all phases of conservation.

Addresses Are Popular

Much time is spent delivering addresses to sportsmen's groups, Boy Scouts, Garden Clubs, civic, service and veterans' groups throughout the

"If you're gonna write about it, you gotta be there," says the division chief as his setter dances with joy state and conventions of most every type. We provide speakers for every occasion where conservation is the topic of discussion. In addition we have color slides for an aid in our lectures, movies, too, when and if necessary. Wherever and whenever the gospel of wildlife conservation, protection and restoration needs expounding, we manage to be present with our messages.

The staff of the division, in the past year (1953), has been increased with the addition of five new employees.

"Sincere conservation" has been our watchword, using every medium possible to impress each man, woman and child with the importance and need of protection and restoration of Louisiana's wildlife.

Division of

Enforcement

Col. V. E. Smith, Chief

. . . without partiality

This report of the Enforcement Division covers the period beginning December 11, 1952 when the Louisiana Wild Life and Fisheries Commission supplanted the former Department of Wild Life and Fisheries, and ending December 31, 1953.

The primary functions of this division are the enforcement of all fish and game laws enacted for the protection of Louisiana's wildlife, commercial fisheries and the fur industry of the state. The enforcement division is divided into five sections. They are: The administrative section, the commercial section, the sports section, the aviation section and the marine section. Game rangers of this division are assigned to duty in any or all of these sections as conditions require, and all game rangers, regardless of their assignment, are under the supervision of the chief of the enforcement division.

The administrative section of the division is set up from an operative standpoint, with a colonel in charge, who is chief of the division. Directly under the chief is an acting major, who is in charge of administrative duties, records, supplies, etc. There is also a major in charge of the sports fishing and hunting section whose duties are to supervise the enforcement of all laws pertaining to hunting and fishing. There is a major in charge of the commercial seafood section whose duties are to supervise the enforcement of all regulations concerning commercial seafood, commercial fishing and trapping activities.

Majors Ben C. Dahlen and Marion Solito leave the main office, 126 Civil Courts Building, New Orleans, on a routine assignment.

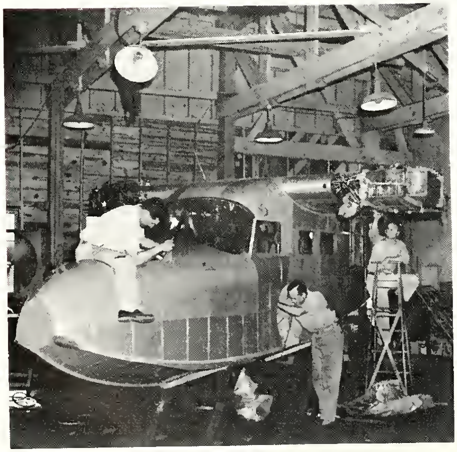
The chief in charge of the aviation section carries the rank of major and his duties are the supervision of the operation and maintenance of all aircraft belonging to the commission. At the present time there is one twin-motored Grumman Widgeon airplane and three Seabee planes. The hangar at the New Orleans airport which houses these planes, a complete general repair shop and stockroom, is leased from the airport and is maintained as a facility of the aviation section of this division. This section has its own personnel under the supervision of a major who is the chief pilot. Two other fully experienced and capable pilots, three mechanics, one mechanic's helper and one clerk typist who is also in charge of the stockroom.

The duties of this aviation section are to patrol all lands and waters of the state, to assist in the enforcement of all wildlife and fisheries laws. This section is steadily becoming more advantageous in aiding the operation of other divisions of the Wild Life and Fisheries Commission, and although assigned under the enforcement division, its services are becoming more and more in demand by the other divisions where speed and transportation, aerial survey work, and similar activities are involved.

The marine section of the division is headed by an acting major and is located on the new

Pilots and mechanics of aviation section pose for cameraman in front of Seabee.

* * *



Mechanics completely overhaul 5-place Widgeon at Commission hangar, New Orleans Airport. Planes are maintained by this crew.

A Seabee takes off in a marsh canal after inspecting activities at a trapper's camp.

* * *

Capt. Anthony Berni, in charge of records, keeps check on arrest records, expense accounts and other data necessary in office matters.

basin canal at 7612 West End Blvd. in New Orleans. The physical assets of this division consist of a repair shop which is capable of doing any type of boat repair and the building of small waterborne craft. In connection, there is a carpenter shop, an outboard motor repair shop, a completely equipped machine shop and a warehouse for stocked parts and materials. There is also a crane hoist capable of lifting any of the boats of this division on to dry dock for repair and painting.

Also housed in this marine section unit is a fixed radio transmitter with a remote control set up in the main office which makes it possible to keep in close radio connection with five of the cabin cruiser type patrol boats, five mobile two-way radios and all four of the aviation section's airplanes.

Radio Valuable Aid

The use of radio in law enforcement in recent years has proved of untold value and there is a certain need at this time for a greatly enlarged and more adequate radio installation. Not only is radio a most helpful facility in the apprehension of law violators, but it is invaluable in the division's rescue work. Lives of individuals and their property have been saved time and again of recent years because of this division's radio connection with its water and airborne craft.

The fleet of the marine section now comprises the "Zoric" which is 55 feet in length; the "Tarpon", 50 feet in length; the "Black Mallard", 55 feet in length, and two 26-foot single engined patrol boats, the "19" and the "38", all of these boats are manned by a licensed boat captain and a cook, the latter also acting as a deckhand. Each of these, of course, is a fully accredited law enforcement officer.

In 1953 the "Picayune", a 57-foot cabin cruiser was added to the section as a gift from private individuals.

In addition, this marine section has approximately 125 boats of the "Arkansas Traveler" make in the 14-foot AN and 14-foot UT categories which were purchased by this division as an economy measure. Being made of aluminum these boats are less liable to deteriorate because of rust and they are considered more safe than other smallcraft because of the two air chambers built in each one that makes them virtually non-sinkable. Other power assets of this section consists of approximately twenty-seven 25-horsepower and fifty-six 10-horsepower Johnson motors which were purchased at factory prices. It is estimated

In the deer country, horses become a necessity with rangers in the heavily wooded areas of Northeast Louisiana.

that approximately 50 more of these motors are needed to fulfill the obligations now confronting this division.

Headquarters For Rangers

The cabin-type cruisers used as patrol boats are all equipped with the latest in boat facilities including modern refrigeration, modern and complete galley for the preparation of food, modern navigation equipment as well as sleeping accommodations from anywhere from three to 11 persons.

Used as patrol boats in our lakes, bayous, bays adjacent to and included in Louisiana's coastal marshes as well as the open sea along this state's more than 950 miles of coastline, these boats have proved extremely valuable in the apprehension of law violating fishermen.

All of this waterborne craft belonging to the law enforcement division are kept in excellent repair by a full-time crew of marine mechanics and boat builders at the Commission's wharf. Each of these boats makes periodical visits to the wharf for a check up and any renovation that may be necessary so that any one unit will be able on a minute's notice, to begin a vital patrol.

License checks are frequent—the year round in the stepped-up enforcement program

During the busier seasons of the year these patrol boats, in addition to their own crew, carry squads of game rangers who use the craft as a headquarters boat and go far afield in the checking for law violators. Speed hulls powered by outboard motors are always kept in tow by these patrol boats for this purpose, and each patrol boat is radio-equipped so that it is in constant contact with the wharf and the office of the divi-

The patrol boat, Tarpon, sets out to sea, sion chief, as well as other boats, airplanes and other mobile units of the division.

In the commercial seafood section of the law enforcement division the area captains of the sports section cooperate with the commercial seafood section in the dispatching of rangers for patrols and inspection tours of all commercial fisheries and the seafood industry. This section alone has seized in the neighborhood of 800 barrels of illegally taken shrimp during the last year, and many violators have been brought to book. A great per cent of these confiscated shrimp have been given to public institutions and the remainder have been returned to the water.

Great Strides Made

Great strides have been made since the Louisiana Wild Life and Fisheries Commission came into being in the stepped-up law enforcement program against violators of the commercial fisheries industry in the state. Due to heavy penalties and the seizure of fishing equipment, the persistent violator is being taught that infringement on fisheries laws are both expensive and impractical. One result has been a big increase in the yearly collecting of license fees. Coupled with the loss of illegal shimp, fish or oysters, and loss of equipment and the necessity for paying a fine upon conviction, is having the desired effect in stamping out of violations.

In the sports section of this division there are now 17 area captains and 124 rangers on the payroll, which is an all-time low for field personnel for this division. At least 20 more rangers are needed now to compile a law enforcement corps to carry on this work throughout the state.

Rangers for the law enforcement personnel are selected on the following basis:

(1) Subject to duty any place in the state of Louisiana.
(2) Willingness to serve for a 6-months' probationary period.
(3) Agreement to participate in training programs.
(4) Willingness to submit to a physical examination.
(5) A reasonable education (able to read and write).

School days for rangers. The group being taught bird identification at Fontainbleu State Park.

Enforcement officials lineup while attending the Louisiana Wildlife Federation Convention. Shown are the division chief, one major and area captains.

(6) Personal record must be free of conviction of any kind for the violation of any laws, local, state or national.

(7) Age limit, 21 through 45.

When the new law enforcement division came into being with the inauguration of the Wild Life and Fisheries Commission, one phase of the reorganization was the proposal to place all rangers in uniform, something that had never been done in the past. Suitable and attractive uniforms for both summer and winter wear were selected and as quickly as possible after the new division was inducted, all rangers became attired in serviceable and presentable manner with hats, ties, caps and jackets to match, so that now there is no law enforcement group in any state agency that makes a better personal appearance while on duty.

The commission is now furnishing a winter field uniform, but the rangers themselves bought their summer uniforms, therefore we feel that the summer uniforms also should be paid for by the Commission.

As the law enforcement division program is set up mainly for the prevention of game and fish law violations the placing of its personnel in uniform was the first step of this prevention program and at the same time it afforded considerable protection for the ranger himself as there could be no question of his identity when he approached a suspected violator. There have been innumerable times during the past year when the fact that a ranger was in uniform eliminated any intention on the part of the suspected violator to disregard an officer in the performance of his duty. As we are obligated with the enforcement of all the state's fish and game laws without favor it is only natural that incidents should arise that caused comment and criticism as to whether a law was good or bad and after our first year of impartial law enforcement we feel that there are some laws on the state's statute books that should be revised.

Records Compared

A comparison of records for the appearance of all violators during past years with the total compiled during 1953 gives a true picture of what this newly organized law enforcement division has accomplished. A total number of 3,755 cases was made during this calendar year, as against 1,433 cases for the two previous years. Of the 1,433 cases for the previous two years 310 of these were made in the remaining 21 days in December, 1952, after the new Wild Life and Fisheries Commission took over the old department's activities. Following are listed the types of violations for the comparative periods.

LOUISIANA GAME AND FISH LAW CONVICTIONS

FOR 1952 AND 1953

Type of Violation	1952	1953
Angling without license	68	1121
Commercial fishing without license	19	107
Selling fish without license	5	36
Electrocution of fish	52	54
Trawling without license	18	33
Trawling at night	27	8
Trawling in closed waters	120	161
Possession of undersize fish	46	182
Possession of over legal limit of game fish	38	41
Possession of game fish for sale	10	18
Possession of undersize shrimp	35	107
Possession of undersize crabs	5	14
Possession of migratory wild fowls out of season	2	16
Possession of undersize frogs	....	2
Possession of over limit fowls out of season	1	9
Possession of illegal deer meat	2	7
Hunting migratory water fowl illegal hours	95	25
Hunting migratory water fowl closed season	34	53
Hunting migratory water fowl without duck stamp	12	8
Hunting migratory waterfowl in baited pond	....	3
Hunting on State preserves	25	56
Hunting without license	67	192
Hunting at night	204	368
Hunting with unplugged gun	34	107
Hunting quail in closed season	4	6
Hunting squirrels in closed season	140	235
Hunting squirrels—over the limit	....	16
Hunting dove in closed season	26	54
Hunting deer in closed season	76	84
Hunting and killing doe deer in closed season	39	8
Hunting deer in closed parish	11	4
Hunting frogs in closed season	20	23
Killing deer with horns less than three inches	13	1
Hunting rabbits in closed season	25	59
Hunting turkeys in closed season	....	2
Hunting snipe in closed season	....	1
Hunting grobeck in closed season	....	39
Hunting crane in closed season	....	2
Hunting egrets in closed season	2	1
Fishing game fish with illegal tackle	40	96
Fishing commercial fish with illegal tackle	10	97
Fishing non-resident license	....	110
Fishing with explosives	....	1
Fishing on state preserve	3	2
Hunting fur-bearing animals with light and gun	28	40
Hunting from power boat	18	10
Hunting robins in closed season	....	11
Hunting woodcock in closed season	3	2
Hunting frogs with gun	2	2
Hunting woodcock illegal hours	....	1
Trapping without license	2	16
Trapping out of season	1	17
Trapping on state preserve	....	....
Camping on Refuge	....	3
Buying fur without license	....	2
Buying illegal fur	....	....
Poisoning Fish	5	6
Pollution of stream	2	....
Blocking of stream	3	56
Taking oysters from polluted area	....	6
Transporting fish out of state	....	1
Attempted murder and aggravated assault	....	3
Shooting fish with light and gun	....	4
Taking fish with bow and arrow	....	3
Catching lizards at night with light	....	3
Camping without permit	11	....
TOTALS	1433	3755

CONVICTIONS FOR 1953

by Parish

Parish	Number
Acadia	28
Allen	13
Ascension	111
Assumption	27
Avoyelles	94
Beauregard	34
Bienville	32
Bossier	62
Caddo	119
Calcasieu	75
Caldwell	26
Cameron	49
Catahoula	44
Claiborne	14
Concordia	82
DeSoto	15
East Baton Rouge	28
East Carroll	58
East Feliciana	8
Evangeline	55
Franklin	41
Grant	49
Iberia	92
Iberville	45
Jackson	6
Jefferson	98
Jefferson Davis	20
Lafayette	34
Lafourche	68
LaSalle	50
Lincoln	4
Livingston	82
Madison	67
Morehouse	86
Natchitoches	178
Orleans	126
Ouachita	70
Plaquemines	99
Pointe Coupee	104
Rapides	117
Red River	26
Richland	40
Sabine	13
St. Bernard	83
St. Charles	129
St. Helena	9
St. James	46
St. John the Baptist	66
St. Landry	109
St. Martin	95
St. Mary	32
St. Tammany	121
Tangipahoa	131
Tensas	34
Terrebonne	123
Union	31
Vermilion	30
Vernon	39
Washington	61
Webster	24
West Baton Rouge	19
West Carroll	9
West Feliciana	9
Winn	36
TOTAL	3755

Most of the Wild Life and Fisheries Commission fleet anchored in the new basin canal.

Following remodeling operations, the steel craft is ready to go on patrol in waters located in any section of the state.

New arrest records were set week after week after the new law enforcement program got into full swing and as the newspapers throughout the state carried full and complete account of each week's arrests everyone became aware of the activities of this division, but after reaching all time highs during the middle of the summer the weekly totals began to diminish and this in itself was taken as proof that all Louisiana was becoming fish and game law conscious. One factor that had considerable to do with this decrease was the fact that the state's newspapers were publishing the names and addresses each week of the game law violators, as well as the penalties assessed by the various judges and justices the peace.

Total fines for 1953 amounted to $36,740 compared to $6,676.91 for 1952. These fines turned over to the school boards of the vari parishes.

State rangers made and turned over to

A steel craft gets remodeled at the Commission wharf.

An engine gets the refinishing touches of a mechanic as the wharf superintendent inspects the rebuilding job at the wharf, located on the New Basin Canal, New Orleans.

U. S. Game Agent 175 cases, which were federal violations of the Migratory Bird Treaty Act.

At the inception of this new law enforcement it was at once apparent that merely commissioning rangers would not get the job done. As a result rangers schools were arranged and thus far two school periods of approximately one week each have been conducted. The first was held at L.S.U. and was attended by the full new personnel of the division. During the several days every phase of law enforcement work was explained by the division chief and others of the Wild Life and Fisheries Commission as well as sheriffs, judges and conservation experts who were on the program. Great stress was placed on proper deportment, personal appearance, public relations possibilities, as well as the proper approach in the examination and apprehension of violators. Another school period was conducted near Covington during the early summer which consisted of similar and added instructions. Throughout the year intermittent meetings of ranger captains have been held for a closer coordination of the efforts of the entire personnel and for the dis-

The colonel and two rangers study a map while on patrol in the Louisiana marshes.

semination of new ideas with regard to better law enforcement.

Salaries Boosted

In order to reach the goal that had been set for this new division it was at once apparent that more stress would need be placed on the type of new members accepted as rangers, and in order to make this possible it was at the same time realized that the minimum salary of $200 per month would be necessary. This figure was authorized by the Commission and with the advent of Civil Service on July 1, a minimum of $230 per month was fixed. This increase, however, was not possible until several months later because of budgetary deficiencies. As all new members of the Enforcement Division must be considered on a six-month probationary period it was only natural that there would be an unusual turn over in the personnel, but now after a little more than a year's experience behind them, most of the personnel are functioning adequately and well. In the main office the system of filing completed cases as well as those pending, has been revolutionized. When a violator is arrested now he is not brought to trial before the office files have been checked to see whether or not he is a first offender or has previous violations recorded against him. This simple procedure makes it much easier for a presiding jurist to assess deserved penalties and it also decreases immeasurably the desire of the defendant to continue to ignore the law through the newspaper accounts of the penalties imposed on various types of violators. The public has become aware of the fact that the great majority of judges and justices of the peace are bearing down more consistently on the game and fish law violators brought before them for sentence.

Two Seabees fly over State Wildlife Refuge Camp in routine patrol.

Wharf Supt. Claude LeBlanc.

Two Ranger captains lead a patrol from the headquarters boat.

The five-place Widgeon, pride of the fleet, stands ready to leave the New Orleans airport for assignment anywhere in the state

Aviation Section

This report of the Aviation section of the Louisiana Wild Life and Fisheries Commission, submitted by John F. Ellington, chief of the section, covers the period beginning January 1, 1952, and ending December 31, 1953, and outlines in detail the activities of this airborne group as well as its hope for a future program that would make it a still greater asset in the overall efforts of the Commission for better conservation of this state's wildlife and fisheries.

Although originally established solely as another unit of the law enforcement division of the Commission the Aviation section's activities have so broadened that it is now operating as an advantageous adjunct to all divisions of the agency.

The many functions of the section have come to be relied on by the Commission in virtually every departmental activity. A brief resume is outlined as follows:

1. Actual enforcement of the state's fish and game laws as well as assisting rangers in detecting and apprehending law violators.
2. Assisting in the inspection of oyster reefs and waterbottoms for the Oyster and Waterbottoms Division of the Commission.
3. Assisting in the work of making biological tests, transporting scientists and providing them an opportunity to study from the air certain conditions and formations that would be far less discernible from land or water surfaces.
4. Assisting the Division of Education and Publicity in the taking of aerial photographs; speedy transportation for outdoor writers and photographers for publications of nationwide scope; transportation for Commission personnel when speedy arrival at a given destination is essential in behalf of public relations, and the transportation of visiting celebrities on whom the Division of Education and Publicity must rely in publicizing Louisiana's wildlife resources.
5. Participating in the taking of game censuses throughout the state, on game reservations and land open to public hunting.
6. Lending a vital service to individuals where rescue work is urgently needed before and after storms; aiding in the rescue of persons and valuable wildlife during floods; aiding in the search for lost persons, boat crews and land and water conveyances; being available at all times to aid in the search for drowned persons, for boats overdue at their home ports and all other types of emergency relief and rescue work.
7. Giving assistance to various Federal agencies in their wildlife and conservation work in Louisiana as well as aiding state agencies other than the Louisiana Wild Life and Fisheries Commission.
8. Full cooperation with all divisions of the Commission wherever and whenever an airplane is needed to make their work simpler and more successful.

Pilots John Ellington, Errol Cloutier and Nat Pedro stand before five-place Grumman Widgeon.

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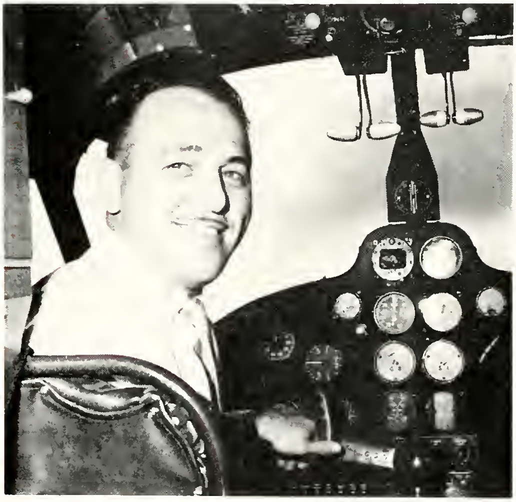


Chief Pilot Ellington at controls of Widgeon.

Errol Cloutier prepares to take off in one of the Commission's three Seabees.

Pilot Pedro, Oysters and Water Bottoms Division, shown outside Seabee.

←

Consistent with this greatly enlarged scope of activities it was found necessary to consolidate all the operation and maintenance of this Aviation section under an individual head and on August 26, 1953, this was done. It has since been proved that this consolidation has greatly improved the service of this section and at the same time has provided a closer check on the cost of the maintenance and operation of this unit. Daily reports are now kept showing in detail the daily cost of operation and maintenance and the actual expenses of the section has been decreased by at least one-third.

The Aviation section now operates three Seabees and one Grumman Widgeon, all amphibious airplanes, subject to call 24 hours a day. It is safe to say each one of these planes is better equipped now for the work expected of them than when they were new. They have recently been completely overhauled, repainted and up-to-minute apparatuses installed that was not part of their equipment when they were turned out at the factory. All are radio equipped; have been equipped for night flying, and instrument panels installed for blind flying. Each of the Seabees is a three-place plane and the Widgeon is a five-place craft.

This section also has its own hangar at the New Orleans Airport with a completely equipped machine and repair shop capable of doing any sort of repair or renovation work needed to keep this flying equipment in A-1 condition.

The personnel of the Aviation section consists of the chief pilot and two other fully accredited pilots, each of long experience in aviation; three mechanics and one mechanic's helper and a stockroom clerk-typist. Detailed reports of the work done by each of these individuals, as well as the cost of the maintenance of the section is submitted semi-monthly to the director of the Commission.

During the last few years considerable favorable publicity has been given this aviation section of the Wild Life and Fisheries Commission. One publication in particular, THE SATURDAY EVENING POST, singled out this unit as the outstanding one of its kind in the United States and carried a most colorful account of the activities of Louisiana's flying game rangers, along with pictorial matter showing how they "got the job done."

In this streamlined world, flying game wardens are not exactly a new thing; but, the Louisiana Wild Life and Fisheries Commission is finding its flying wardens extremely valuable in the enforcement of the fish and game laws. And the law violator has found that the approaching drum of an airplane motor is a forerunner of apprehension.

In the days before the airplanes were put in use by the Louisiana Wild Life and Fisheries Commission, fish and game violators played a merry game of tag with agents in the Louisiana bayous and marshes. Knowing the labyrinth of canals, bayous and lagoons as they knew the decks of their own boats, they had little difficulty in dodging the enforcement officer. But they don't dodge the radio-equipped planes.

Ducking into shallow bayous or marshes, where the patrol boats of the Commission can't go, doesn't give them sanctuary, either. A patrol plane pilot can spot the violator, radio his location and direct boat-borne officers to him, if necessary. Or, if the water or terrain is suitable for landing, the flying warden can make the arrest himself.

"Flying Squadrons" of rangers are being employed with excellent results in all parts of the state. These units are sent out from headquarters as special squads wherever violations of a considerable number are reported. Because they are not known in the areas into which they are rushed, they are able to avoid the identification which too many times warns the violator to get under cover, and in a few hours they have been known to entirely clean up communities where illegal hunting and fishing has been reported. The work of these squadrons is increasing daily and the effect is being felt throughout the entire state, with the result that much game and countless fish are being saved from illegal destruction.

That the aviation section has become one of the important cogs in the machinery of the entire Wild Life and Fisheries Commission is unquestioned. Aside from its value as a law enforcement unit, the speed with which this air service can get division personnel to distant points means a great saving in time and money. Trips that would take eight to ten hours by automobile or boat may be made in an hour or less by airplane. The speed with which the world moves today must be matched if we are to keep pace.

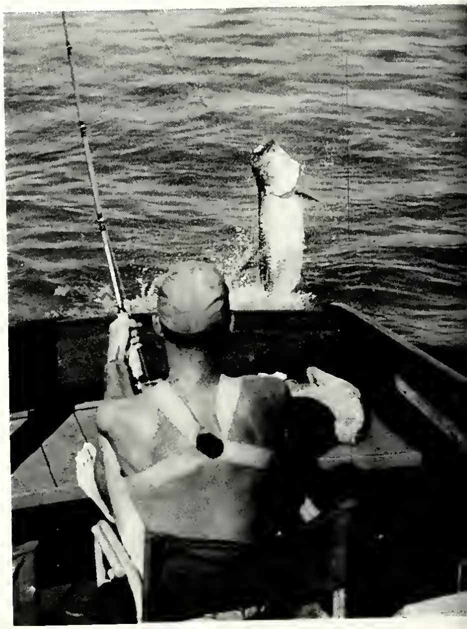
The first two barracuda caught in the Gulf off Grand Isle by John Lauricella of New Orleans.

Tall willows shelter bass, bream and sac-a-lait in this old river bed.

* * *

* * *

A string of largemouth bass taken from lakes in the Baton Rouge area.



A tarpon at Southwest Pass—tarpon abound in these waters from June through October.

Division of

Fish and Game

George C. Moore, Chief

. . . harvest the surplus

On April 30, 1953 Major James Brown, chief of this division, resigned and on June 16, 1953 the present chief assumed the duties. The operation of the division during the past two years has progressed on an accelerated scale in keeping with the overall stepped-up program of the Wild Life and Fisheries Commission. Very few changes have been made in the basic policy, nor is any anticipated. It is expected, however, that certain phases of the program that have outlived their maximum usefulness will be deemphasized and other work that is needed to meet the ever-changing ecological conditions in the state will be accelerated. This is in keeping with the aim of the Louisiana Wild Life and Fisheries Commission to use dynamic and up-to-date methods in future game management.

Since the ecology of the state is continuously changing, it is necessary that game management practices and procedures be changed to meet the condition. These changes will be based on sound biological research and will be applied to produce maximum benefits to the sportsmen of the State.

With the brief note on background of game conditions in Louisiana, an attempt will be made to briefly outline the major objectives of this division during the next two years.

"The limit on a log" after a successful hunt in Franklin parish.

It is the aim and duty of every employee of this division and every citizen in the state to produce, protect and maintain the natural resources in the state. With the increasing hunting pressure caused by the growing number of hunters and ever increasing changing and destruction of the game and fish habitat, our job of furnishing satisfactory hunting and fishing is becoming more difficult. Not only are the hunters increasing and the suitable game range being reduced, but much of the suitable and adequate range is being retained by the owners or through leasing to private groups for private hunting preserves where relatively few individuals may hunt. This further complicates the problem of hunting for many sportsmen because much of the best areas are now in private hunting clubs.

It is believed that since this condition exists and it is an inherent American right to manage his property as he sees fit, it is the duty of the Fish and Game Division of the Wild Life and Fisheries Commission to do everything in its power to alleviate this condition. It is, therefore, necessary for this division to obtain large tracts of good game range and manage it for maximum game production for public hunting.

To determine the best management methods for the game and fish in the state a good and continuous research program is needed. It would be impossible to increase game on an area without

This large largemouth is proof positive that the big ones swim in the lakes, rivers and bayous of Louisiana. This beauty came from Palmyra, one of the many "old river" beds.

knowledge of the conditions existing on the area or the habits of the animals in question. It is impossible to adequately manage the game, including the harvest by the sportsmen, without basic facts which can be obtained only through research. It is, therefore, evident that a sound game and fish management program must be based on research and the management of areas for public hunting must go hand in hand with sound research.

During the last two years the following sections of this division were in operation and it is expected that the same section will function except the quail hatcheries at Baton Rouge and Lacombe, which were discontinued at the request of the sportsmen in the State as useless tools for improving quail hunting in the State:

Chief's Office—New Orleans
Federal Aid Section—New Orleans
  (This includes Pittman-Robertson or game section and Dingell-Johnson or fish section of the Federal Aid Activities)
Research Section—New Orleans
Predator Control—Statewide
Lacombe Fish Hatchery—Lacombe
Water Hyacinth Control—Statewide
Monroe Fish Hatchery—Monroe
Beechwood Fish Hatchery—Forest Hill
Fish Rescue Crew 1—Newellton
Fish Rescue Crew 2—Forest Hill
Lake Bruin Fish Management Area—St. Joseph
Northwest La. Fish and Game Management Area—Natchitoches

Tensas deer make a getaway

→

Lake Bistineau Fish and Game Management Area—McDade

Catahoula Lake Game Management Area—Deville

General Warehouse and maintenance plant—Baton Rouge
(Old Baton Rouge Quail Hatchery)

During 1952 the Baton Rouge quail hatchery raised and released 5,875 birds from 10 to 15 weeks of age. In addition, birds were hatched and sent to the Lacombe Hatchery where 1,644 were raised and released in the state. In addition to quail raised, 29,110 birds were purchased from various sources and distributed in Louisiana.

In 1953 the Commission voted, at the request of the sportsmen of the state, to discontinue the quail hatcheries. To save the investment already spent, the incubators were not discontinued until mid-June. During the year 4,635 birds were raised and released to each parish in the state. A total of 36,627 birds were released in Louisiana in 1952 and 4,635 in 1953.

The Fish Rescue program has continued uninterrupted except by spells of bad weather. In 1952 a little more than two million fish were removed from undesirable areas and placed in public fishing waters. As usual, the bulk of these were white perch and bass. These fish were restocked in waters in 41 parishes. The 1953 program was somewhat reduced mainly due to extremely high water during the spring and early summer. About one and one quarter million fish were moved to more desirable locations and distributed to 34 parishes. In addition to the rescue work, bass from the hatcheries, totaling approximately one quarter million were distributed to public fishing waters each year.

Catahoula Lake continues to be the finest waterfowl area in northern Louisiana and because of the refuge, it has maintained waterfowl under extremely heavy hunting pressure. This lake serves as a focal point for waterfowl shooting throughout most of the northern part of the state and should any kind of program change the present condition of the lake it will materially reduce waterfowl shooting throughout the entire northern half of Louisiana.

The Lake Bruin, Lake Bistineau and Northwest Louisiana Fish and Game preserves are furnishing some of the finest fishing in the state. Fishing has been good during the past two years and if rough fish can be kept under control, sport fishing should continue to be good.

LAKE MANAGEMENT

By Harry E. Schafer, Jr.

A program to improve the conditions for fishing in a lake is called Lake management. The method is usually different for each lake but there are general principles and procedures that are used in all programs. It must be understood that fish, as well as all living organisms, should have a salubrious habitat, sufficient food and con-

This fox squirrel presents a difficult target.

Fish, taken after a lake was chemically treated, are being weighed. They are later identified and aged.

ditions favorable to successful reproduction in order to have a successful life.

The composition of the water is obviously of basic importance and water samples must be secured and subjected to a series of analyses. These analyses consist of physical, chemical and biological examinations. The main physical readings are the temperature and the turbidity (this is the measurement of silt present and consequently the amount of light). Light is an important factor in lake management. Lack of light, due either to silt or heavy floating vegetation, may render a lake barren of fish. Again, if too much light penetrates the water, it may cause an abundant growth of underwater plants so that the lake will again be out of balance. The biological examinations of water include identifying the species of microscopic plants and animals present. Fisheries biologists call these floating microscopic organism plankton. Plankton is extremely important in its role in the food chain. Phytoplankton, as the plant part of plankton is called, utilizes the nutrient material in water, carbon dioxide and sunlight in its metabolism. This phytoplankton is the food for the animal plankton which is called zooplankton. The zooplankton is eaten by the smaller fish and in some instances, by adult fish.

The intricacy of balance in a lake is almost beyond comprehension. Presence or absence of a single biological factor may be decisive. Failure of several links or sometimes a single link in the food chain may mean complete failure of the lake.

The fish population is checked regularly in lake management to determine if the species are in proper proportions. This is important because a body of water can only support so many pounds of fish. If one species becomes overpopulated, that species would soon eat all the food and the result would be a stunted population. There are several methods for sampling a fish population which include seines, minnow nets, trammel nets, hoop nets, traps and by the use of a chemical. The method mostly used by the writer is a five per cent rotenone emulsion. This emulsion is mixed with 4-8 parts of water before applying. An area, usually an acre, is marked off in the lake. Then a curtain of rotenone solution is applied to the perimeter by the use of a power pump. After this curtain is applied, the surface of the area is sprayed. Several sample areas are tested, the number and location depending on the size of the lake, but one is always taken by shore, in the middle and in a cove if one is present. About fifteen minutes after the area is sprayed, the first fish usually appear on the surface. (In all the lakes tested in Louisiana, the first fish have always been a gizzard shad.) All the fish are picked up when they come to the surface and then are identified, weighed, sexed, counted, measured and usually scale samples are taken.

The fish scale samples which are taken are very important because the age and growth rate of a fish can be determined by examination of the scales. A scale consists essentially of a center of growth surrounded by added growth at the scale edge in the form of "rings." Each scale addition or new ring depends upon the rapidity of growth of the fish which in turn depends upon a number of factors such as temperature, food supply and vitality. These rings are read directly from the scale or from an impression made in plastic. In this laboratory, the scales are read from plastic impressions. To make these impressions, the cleaned scales are placed on warm cellulose acetate slides and then run through a jeweler's press which produces a negative of the scale.

Fish and Sodium Amytal

Recently it has been found that the addition of sodium amytal (this is a chemical used as a sedative) to the water when fish are being trans-

A man, a dog, a pirogue, a gun and and opening day. There's nothing finer. These sentiments are okayed by the American watching his master as daylight approaches in the marsh country.

ported, more fish per unit volume of water may be carried.

Some preliminary experiment on the *after* effect of sodium amytal used in fish transportation have been conducted by biologist Donald Geagan and the writer. Four species of fish have been used in these experiments. They are: (1.) Largemouth black bass, these were young bass approximately four inches long, (2.) blue gill bream, these were bream of the year, (3.) Gambusia-top minnow, (4.) Mollienisia sp.

The bass, when introduced into water containing one grain of sodium amytal, seem to be affected within 30 to 60 seconds. After this time, it was possible to reach into the water and pick the bass up with your hand. About the same length of time was required for them to recover from the effect of the drug when replaced in fresh water.

A series of 25-inch largemouth bass survived for 72 hours in four gallons of water containing from four to 20 grains of sodium amytal per container. The temperature of the water was 70°F. and no means of aeration was used. These fish were then placed in fresh water tanks and have been eating and living, what appears to be a normal life for four months.

The bream and two species of minnow were not affected as rapidly or definitely as the bass. A longer period of time was required to notice any slowing down of their movement and even after an hour, it was difficult to catch the fish by hand. Bream survived 48 hours in water containing two grains per gallon and lived over one week after being replaced in fresh water.

Results on the minnows are not as clear as the other two species as there was a daily mortality in control and in experiments. Most of the minnows developed a fungi, probably Saprolegnia sp., when replaced in the tanks with fresh water. Some of the individuals did survive one week in the fresh water.

More experiments are being carried on along this line and in the coming year they will include more species and the work will be on a larger scale.

Cane River Lake

On October 10, 1953, a section of Cane River, where the fishing had been poor, was sprayed with rotenone in order to rid the lake of fish so that it could be restocked with the correct species and number of fish. This section was between the two dams at the northern end of the lake. It is approximately two miles long and averages approximately 150 feet wide. The average depth is approximately six feet.

Eight hundred pounds of five per cent rotenone powder mixed with water was sprayed by

Crowds line the banks of Cane River to pickup fish killed by chemical solution administered by P-R men.

plane which took approximately twenty minutes to dispense. The S & F Dusting Company, Inc., supplied the planes and pilots at no cost to the state. Because of the advanced notices that this work would be done and the fish killed would be edible, there were over 200 boats on the lake and approximately 2,500 people along the shore taking the fish as they appeared on the surface. Therefore, the amount and species of fish removed was difficult to determine. It was apparent, however, that a large amount of shad was killed.

On November 2, the kill was checked by using a five per cent liquid emulsion in three-one acre plots. The kill proved not to have been 100 per cent effective as three species of sunfish were taken. They were the bluegill bream, the goggle-eyed perch and the orange spotted sunfish. They were present in the lake at the rate of 50 per acre. Gar were seen breaking the surface in several places along the lake but none were taken in our check areas. (However, some gar were killed by the initial application of rotenone.) No shad were present.

On December 2, the area was revisited for observation. The water was found to be very green, having a Secchi disc reading of 18 inches. There were large numbers of small crustacea present. Two species of aquatic snails (Limnea and Planoribis) were present in very large numbers. No gars were seen during this check.

On December 10, toxicity tests in the lake were conducted to determine whether or not any poison remained. One hundred and sixteen bluegill bream of the year, three adult bream and one goggle-eyed perch were placed in line boxes in the lake. All fish survived over 36 hours. This showed that the chemical had dissipated and become ineffective. The turbidity was high due to silt after heavy rains. The Secchi disc reading was eight inches. The lake was approximately six inches over the spillway level. These findings showed it was safe to begin restocking.

On December 15, the Federal Fish Hatchery at Natchitoches, stocked this lake with 25,000 blue gill bream and the bass will be stocked next spring.

Toxicity Test

Controlled laboratory experiments with regards to toxicity for fish of the following chemicals were conducted: (1.) The currently used spray solution of 2,4-D which is one quart of 2,4-D (2,4-Dichlorophenoxyacetic acid) per 50 gallons of water with two and a half ounces by weight of powdered detergent, applied at the rate of one-third to one-half acre, was tested to determine whether or not the addition of the detergent would produce any toxic effects on the fish. The fish used in these experiments were the goggle-eyed perch (Chaenobryttus coronarius). (2.) The toxicity of Polyborchlorate (a soil sterilizer) was checked with regards to largemouth black bass (Huro salmoides).

Fishway for Lake Bistineau

Because of the large concentration of fish below the new spillway of Lake Bistineau each spring, the program that is being set up to study reheatropism by the use of a fishway should prove both interesting and factual to fisheries management. There are reports from reliable local sportsmen that these fish did enter the lake by swimming over the old spillway when there was a flow after the spring rain. The old spillway was three feet lower than the present one.

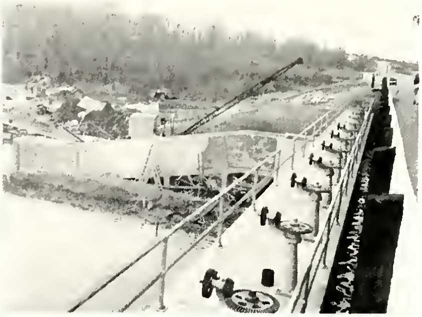
Every spring during high water, fish come from the Red River and small bayous into Loggy Bayou and then to the spillway. Some of the fish included in the spring "migration" are the members from the Centrarchidae (basses, sunfishes and crappies), Serranidae (white and yellow bass), Anguillidae (American eel), Ameiuridae (catfishes,), Castostomidae (buffaloes and suckers), Clupeidae (shad), and Cyprinidae (carp) families.

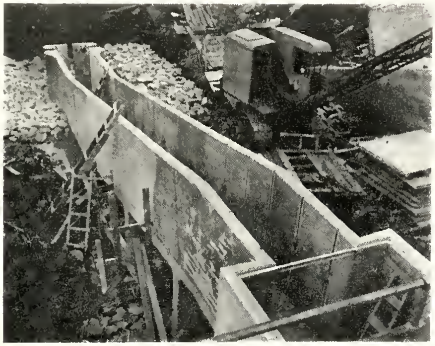
If these fish did cross the low spillway to enter the lake, then it is possible that they would use a fishway. The restocking from this source should give better fishing in the lake.

Four champions stand on point, led by Tennessee Zev, 1947 quail futurity champ.

Fish-way at Lake Bistineau. →

Side view of fish-way. ←





Top view of fish-way under construction.

The Bistineau fish-way is the first of its kind placed in Louisiana waters.

Basic requirements that are recommended by A. M. McLeod of Iowa for fishways and that are possessed by the type selected for study are:

1. (1) The size of the free cross-section should be sufficient for unhampered swimming movements.
2. (2) The hydraulic condition should be such a nature as not to overtax the energy of the fish using the fishway.
3. (3) Easy accessibility of fishing.
4. (4) Strong construction.
5. (5) Remain free from debris.

The fishway is placed in the second control gate at the western end of the spillway. It consists of a concrete chute approximately 58 feet in length on a one on five slope. This chute is approximately four feet wide and six feet deep. There are three entrances to the fishway which can be opened and closed independently. At the upper end of the chute, there is a trap. When and if the fish use this fishway, they will be trapped in this basket which is raised by the use of hand hoists. When the basket is raised, the fish will be counted, weighed, measured and tagged and then they will be released into the lake.

There are three different types of baffle plates that will be used in this fishway experiment because the efficiency of the different baffles is unknown in the use with our local sport fish. The chute is so constructed that if these different baffles are unsuccessful, more plates can be made. The whole fishway is covered with iron wire gratings so that it will be impossible to fish or molest the inside of the chute in any way.

Farm Pond Recommendations

It is important to have correct combination of species of fish in the right proportions for continued successful fishing in farm ponds. The most successful combination to date has been one of bluegill bream—largemouth black bass.

The bluegill bream or "perch" is a very good eating fish and when the right tackle is used, it is an excellent sport to land a few of the larger ones. The nesting habits of this species are similar to those of the other sunfishes, however, they are more "sociable" and their nests are made close together. Each nest is about two feet in diameter. The eggs (10,000-20,000) are fertilized and deposited in the nest. The bluegill's diet consists of aquatic insects, crawfish and small fish.

Largemouth black bass or "green trout" are stocked in farm ponds not only for their value as a sport fish and good eating quality, but also, they are necessary to control the number of bluegills present. The bass nest is similar to the bluegill nest but they are not as close together. This is a carnivorous species, his diet consisting mostly of fish.

H. S. Swingle recommends the following numbers of bluegills and bass to stock per acre:

Fertilized ponds: 1,500 bluegill fingerlings added in late summer, fall or winter. 100 bass fingerlings added the same fall or winter or 100 bass fry the following spring.

Unfertilized Ponds: 500 bluegill fingerlings added in late summer, fall, or winter. 50 bass fingerlings added the same fall or winter, or 50 bass fry added the following spring. (Fry are newly hatched fish—Fingerlings are young fish an inch long.)

Because of the greater poundage of fish that can be supported in a fertilized pond, it is well worth the time, effort, and money spent to do this chore. Commercial fertilizers are evaluated and sold on the basis of their nitrogen-phosphorus-potassium content, this being coded as three hyphenated separated numbers. We have had considerable success with 8-8-8, 6-8-4 and 5-10-5, fertilizers in raising fish.

The fertilizer is first applied to a pond in the spring. To each acre of water, 100 pounds of fertilizer is broadcast on the surface. In a few days, a green or brown color should appear (this color is caused by the rapid growth of microscopic plants and organisms).

This growth should be heavy enough so that when the arm is submerged into the water up to the elbow, the hand is not visible. Fertilizer is added each time that the water clears sufficiently for the hand to be seen (this is usually three to four weeks). These applications are continued until the cold weather begins making the pond receive 10-15 applications.

The addition of fertilizer has another advantage. By producing the microscopic growth, light penetration of the water is reduced to a minimum so that aquatic plants are shaded and their growth controlled to some extent.

Should any aquatic plants appear in the pond, they should be eliminated at once. Most of the broad leaf emerged plants can be controlled with 2, 4-D. Cutting the plants several times often proves effective. It should be stressed that a pond with a heavy growth of aquatic plants will soon become unbalanced in its fish population.

A great number of farm ponds have also become unbalanced because they have not been fished heavy enough. It is the general belief that the less the pond is fished, the more fish the pond will produce—this is partially true as the number of fish will increase but they will all be stunted and not table size.

Old ponds that are out of balance can be corrected fairly easy by the removing of a part of the fish present. There are several methods to do this, but the Louisiana Wild Life and Fisheries Commission must be contacted before this is done.

Fish Kills

A total of seven "fish kills" was investigated in the last biennium. A "fish kill" is defined as a large number of fish suddenly dying in a body of water. There are many causes for these kills but the most frequent is the lack of dissolved oxygen. Although a fish may survive for a short

Br'er Coon is a controversial animal, but one affording sport for thousands of Louisianians.

time under these circumstances, they cannot endure this condition long and soon die. The death and decomposition of the first fish accelerate the oxygen reduction thus killing more fish. Factors that initiate the reduced oxygen are many and complicated. Some of these factors are listed.

When there is a series of warm cloudy days, the water will lose some of the oxygen dissolved in it, as warm water cannot "hold" as much oxygen as cool water. Also, because of the lack of sunlight, the plants cease their photosynthesis thus halting their oxygen production. Another factor is that seasonal changes may kill aquatic plants and the decaying vegetation will use much oxygen. The chemically killed plants in plant control will also have the same effect.

Some other factors that cause "fish kills" are chemicals added to the water that are toxic to fish, high temperatures, diseases, and a high carbon dioxide content.

Of the seven investigations, five were apparently caused by a lack of oxygen. The sixth case was a small pond approximately one-fifth of an acre in area and approximately 10 feet in deep with no shoal areas. The investigation was made two days after the kill and the oxygen content was sufficient for the fish. The owner stated that the water was red when the fish died. The plankton samples showed a large number of Euglena (a one cell animal) which may have killed the fish with the by products of metabolism or by the death of large numbers, thus reducing the oxygen at the time of the death. The kill was complete.

The seventh case was a report that fish were dying in a half mile stretch of Black Lake Bayou. The water had a rusty color and all species of fish died. This investigation was made ten days after the kill and all the conditions were back to normal. The dissolved oxygen was sufficient and fish were back in the area.

Parasites In Fish

Many fresh and saltwater fish are brought into this office for the identification of "worms" in the fish. There are approximately 50 species of fresh water fish parasites in Louisiana, but the most frequent complaint concerns the presence of black, yellow, red or white cysts in the flesh of the fish immediately under the skin. These structures are actually stages in the life history of four highly different kinds of fish pests. These parasites have varied life cycles. To mention one, the black grub matures and lays its eggs in the intestines of the kingfisher (a bird). When the eggs of the parasite are passed into the water, they form microsopic worm-like structure called miracidia. The miracidia penetrate the bodies of certain species of snail, where they develop into a forked-tailed cercaria, which leaves the snail's body to become a free swimming organism. This organism actively penetrates beneath the scales and into the flesh of the bass, where it develops into a cyst in the muscles.

Fish parasites are not restricted to fresh water fish as many infected saltwater fish are brought in. The most frequent infection of the speckled trout is the larval stages of the cestods, a group of parasitic worms which undergo complicated life histories, passing through, in some cases, as many as three successive "hosts". The stage that appears in the muscle is an early stage in the life cycle, of these parasites and it is often

Thousands of mallards rise from the rice field near Iowa, La., where they concentrated to feed on "red rice."

impossible to make identifications since the critical morphological characteristics upon which the description of various species are based have not yet appeared.

Fortunately, all fish parasites in Louisiana are incapable of living in man, so that any fish containing these parasites may be eaten without fear of human infection.

Plant Control

A big and important problem in most of our Louisiana lakes has been the control of aquatic plants. These plants are roughly broken into three categories:

(1) Submerged plants—this group usually referred to by the sportsmen as "mosses", contain some of the most difficult to control.

(2) Emerged plants—a number of these are controlled with a solution of 2,4-D.

(3) Floating plants—this group includes the infamous water hyacinth which fortunately succumbs to 2,4-D solution. This also includes the floating filamentous algae.

The following are some experiments conducted by Donald Geagan (biologist water hyacinth control) and the writer in an effort to find a chemical or a combination of chemicals that would help to control these plants in our lakes:

Alligator weed (Alternanthera philoxeroides) is high on the list of aquatic plant nuisances. Many control experiments have been tried on this plant. We have tried various concentrations of 2,4-D, a combination of cutting and 2,4-D, and 2,4-D with a detergent without a lasting success. Experiments now in progress using CMU at the rate of 50 pounds/acre, and 2,4-D are proving satisfactory so far. The method is to spray a three foot strip along the shore where the plant is rooted with a CMU solution. After three to four weeks, the rest of the plant is sprayed with a solution of 2 quarts of 40 per cent Amine of 2,4-D per 50 gallons of water.

Zizaniopsis sp. is a troublesome plant in the shoal area of many lakes. Various chemicals were tested on this plant. Water solutions of 2,4-D in

This is a 184-pound Tensas buck, being weighed as a part of the P-R deer study project.

various concentrations and 2,4-D in kerosene in various concentrations proved ineffective. Various concentrations of CMU did not stop regrowth to several patches of this plant that had been cut and burned. To similar patches of cut and burned Zizaniopsis sp., polyborchlorate at the rate of one pound per 200 square feet was applied with considerable success. There was no regrowth after four months.

A one pound per gallon of H_2O solution of 90 per cent TCA (sodium trichloroacetate) gave a complete kill in all of the test areas, but the effective concentration was also toxic to fish.

Nymphaea, the water lilies, prove to be a nuisance in many lakes. Experiments with various concentrations of 2,4-D proved ineffective. At the present time, we are testing 90 per cent TCA, CMU and polyborchlorate in various concentrations. The method used in this case is that the pond that contained the lilies was drained and the plants and ground were sprayed. The pond was refilled two months later. The results of the experiment have not been obtained as yet. Sodium arsenite was used with fair success on the water lilies.

Pickerelweed (Pontederia sp.) grows on the muddy shore and shallow water. This plant is easily controlled by spraying with a solution of 1 pound of 2,4-D in 50 gallons of water.

Water primose (Jussiaea diffusa) was controlled by both one and two quart 2,4-D per 50 gallons water solutions.

The yellow water lily (Nuphar sp.) was not controlled with various concentrations of 2,4-D with water. Various concentrations of 2,4-D with kerosene were tried without much success.

An alga (Aphanocapsa sp.) in one pond at the Lacombe Fish Hatchery has not been controlled by fertilization. Experiments now in process include the use of copper sulphate, sodium arsenite and alpha Amine D Acetate.

Experiments on the control of Chara sp. (musk grass), Najas sp., and Needle Rush are now being conducted. Chemicals that are being used in various concentrations are CMV, Palyborchlorate, 90 per cent TCA, Sodium Arsenite and Copper Sulphate. The results of these experiments have not been obtained as yet.

Fish Shocking

Investigations are now being conducted on electrically shocked fish to determine a method whereby they may be identified as fish taken illegally by some "shocking machine."

An old field telephone is used to collect the fish which are then taken to the laboratory for examination. The fish are examined for hemorrhages from the blood vessels of the gills, the anal vent and the skin. The vertebrae are examined for fracture. Blood vessels are examined for ruptures.

More work is planned on this project and it is possible that in the near future, we will be able to establish, and prove whether or not a fish has been electrocuted.

Pond Experiments

Ponds at the Lacombe fish hatchery will be used for fish experiments. These experiments will include various stocking methods in regards to both numbers and species. One experiment will include the introduction of goldfish to determine their reproduction and their effect on sport fish.

Along with the fish work in these ponds, various plant control experiments will be conducted.

One pond will be stocked and managed, so that the young people will have a place to fish. When this pond is ready for fishing, it will be opened to the public and children's fish rodeos will be held.

Water Hyacinth Control Biology Work

By Donald W. Geagan

The biologist for the water hyacinth control program works in conjunction with the program's spraying crews. It is his duty to make surveys of areas which are to be sprayed and to re-check the areas after the spraying operations are complete.

During the past biennium, surveys have been made by the biologist for the hyacinth program of areas which have been sprayed in the past along with new ones. The purpose of which has been to establish which areas are in need of additional or initial spraying and to what extent. Such surveys consider the sources of possible reinfestation, how large an area is in need of spraying and how difficult the job will be. Also taken into consideration is the value of the area as a fishing or hunting resource.

In determining how difficult a job will be such conditions as depth of water, amount of submerged debris which would hinder the spraying barges and accessibility to the hyacinths to be sprayed as regards to trees, stumps and aquatic vegetation, are checked. In addition, consideration must be given to the ability of the spraying crews to get their equipment to the area. And as this equipment is rather large and heavy, it often presents a problem.

With regards to the possibility of reinfestation, consideration is given to any connecting bodies of water which may be infested with hyacinth and whether or not

Water hyacinths choke a roadside canal, checking flowage and smothering waterborne creatures.

there is a possibility of these plants entering the sprayed areas. A description of such areas is given to the Superintendent of the Water Hyacinth Control Program.

After the spraying operation is completed, another survey is made of the area in order to determine the amount, if any, of regrowth or of areas which may have been missed by the spraying crews. Such regrowth may be due to several things. One of which is the failure of mats to sink due to other types of vegetation holding them together. These mats have become saturated with hyacinth seeds over the years and when they fail to sink they provide ideal conditions for the germination of such seeds. When such a situation arises it is only practical that the mats be removed or that they be sunk by grinding. Otherwise the seedlings from them will reinfest the areas as rapidly as the spraying crews clear them. A condition similar to this is encountered when mats which have sunk but due to the accumulation of gases caused by decomposition, have floated to the surface.

Once an area has been cleared periodic surveys are made by the biologist in order to determine the amount of reinfestation by seedlings or other causes. When such reinfestation is noted a report is given to the hyacinth program superintendent. Perhaps it should be mentioned here that it is extremely difficult and frequently impossible to completely and permanently clear an area of any size of hyacinth in one spraying operation. Not only is it very difficult to ferret out and spray each and every plant but also there are the seeds which have been deposited over the years which must be considered. These seeds will lie dormant for several years, if necessary until the proper conditions for their germination occur, then with the development of the seedlings, the "cleared" area is again infested with hyacinths.

In addition to the making of surveys for spraying operations, it is the duty of the hyacinth control biologist to check any complaints of the spraying crews as to the inefficiency of the spray solutions. At present, the spray solution used by the spraying crews consists of one quart of 40 per cent Amine of 2,4-D (2,4-Dichlorophenoxyacetic acid) per 50 gallons of water. This is applied to one-third to one-fourth acre of water hyacinths, depending upon the individual spraying conditions. By means of control experiments it was found that the efficiency of this solution could be increased by the addition of two and one-half ounces of detergent. The toxicity of this solution for fish has been tested at many times the concentration used in actual operation and it has been found harmless at these concentrations.

The use of the above spray solution is at present the only means of hyacinth control employed by the Louisiana Wild Life and Fisheries Commission. No grinding or chopping machines are used. The use of 2,4-D in the control of hyacinth has been found to be the most economical and practical to employ. The herbicidal qualities of this chemical as regards to hyacinth can best be appreciated when it is taken into consideration that there are as many as one hundred and fifty hyacinth plants per square yard and that one quart spread over one-third to one-half acre can give up to as high as a 98 per cent kill.

As of this report all major bodies of water which have a water hyacinth problem and which are located north of Avoyelles and St. Landry parishes have been surveyed with regards to their individual problems. In some instances the follow-up surveys have been made after the spraying operation has been completed. All the areas which have been sprayed have not been resurveyed since the time period has not been long enough to allow for regrowth. However, these areas will be rechecked.

In the southern section of the state surveys have been made on the following sections:

Lake Boeuf, Lafourche Parish. Being sprayed (by local groups, 2,4-D furnished by Commission).
Fieldlake, Lafourche Parish.
Lake Long, Lafourche Parish.
Bayou Laccasine, Jefferson Davis Parish.
Bayou Nezpique, Acadia Parish.
Bayou Plaquemines, Acadia Parish.

Bayou Des Cannes, Acadia Parish.
Bayou Queue de Tortue, Acadia Parish.
Mermentau River, Acadia Parish.
Millers Lake, Evangeline Parish, partially sprayed.
All the bayous and rivers between Pass Manchac and Bedico Creek which enter Lake Pontchartrain, Tangipahoa Parish.
Lake Martin, St. Martin Parish, partially sprayed.
Borrow Pits adjacent to Louisiana Highway 292, to be sprayed, Vermilion Parish (spraying by local groups, 2,4-D furnished by Commission).

It is intended that as soon as the program can incorporate it, work will be done on these and additional areas in the southern sections of the state.

Water Hyacinth Control Section

By J. G. Dutton

Shortly after the first of January 1953, the water hyacinth control section of the Fish and Game Division was reactivated. Under instructions by the director, 10 men were employed to man five spray barges under the classification of sprayer and sprayer helper.

The operating equipment, such as barges, pumps, air-cooled engines and outboard motors were on hand in varying degrees of usable condition. There was also an adequate supply of chemical, 2,4-D (2,4-Dichlorophenoxyacetic acid) on hand. With the exception of the outboard motors, a few of which were new and unused, the equipment was in poor condition. The pumps, air-cooled motors and barges have been used by our crews only because they have been able to keep them together by almost constantly making repairs. Furthermore, the three above-mentioned items of equipment are far too large and heavy, and, therefore, too cumbersome to effect the maximum of efficiency in the work of hyacinth control.

All personnel were given a complete training course in the handling of every piece of equipment, as well as the handling of the chemical used as a spray. These crews have successfully sprayed and killed water hyacinths in rather close proximity to growing food and staple crops without perceptible damage to them. This has been particularly true as concerns cotton, which crop has on some occasions in the past, allegedly been damaged by the careless handling of this chemical in hyacinth eradication operations. It should be stressed that the chemical used is not a "poison", but is a powerful hormone and will not harm fish, animals or people.

There have been some changes brought about by us in the handling of our equipment and the application of the spray, as well as in the content of the 2,4-D solution as applied to the hyacinths. In order to offset the possibility of the sprayed solution coming in contact with plants other than water hyacinths, such as growing cotton and other field crops, it was immediately concluded that this would not occur if the spraying operation did not produce a fog. As is easily understood, this fog is very light and easily picked up by the slightest breeze and carried far from its intended destination, the water hyacinth plants. This was accomplished by a reduction in nozzle pressure from about 300 pounds per square inch to approximately 75 pounds. Under this pressure, a fog is not produced, but rather the liquid goes from the nozzle in the form of very small droplets which are too heavy to "float" with a breeze or even a moderately strong wind. Another change has been the addition of a small amount of powdered detergent to each barrel of spray solution. By the introduction of this substance, it has been concluded that the droplets, as they are sprayed, are much heavier, which further cuts down the possibility of "floating with the breeze." Of equal importance is the fact that the use of the detergent definitely causes the sprayed solution to adhere to the glossy surface of the hyacinth plant and not be lost by "slipping" off into the water. This latter change was brought about by research and experimentation conducted by our biologist, Donald Geagan, and has resulted in a much better kill of the hyacinth.

Our most important objective has been "*to completely eradicate the water hyacinth from a given area, as economically and efficiently as possible, so that only periodic return operations, by skeleton crews, can keep the area from ever becoming reinfested by this pest as they are to-day*". It must be understood that if all hyacinths are not removed, reinfestation will occur in a surprisingly short time and the results of all previous efforts will be completely lost.

Actual work by the crews was started on February 2, 1953 in the Krotz Springs area. Our warehouse for the storage of chemical and equipment was located at this point for approximately five years previously. At the suggestion of the chief of the Fish and Game Division this warehouse was moved on July 31 to an unused building at the quail hatchery near Baton Rouge, thus effecting a saving of $40 a month rent. All the accessible bayous and lakes were worked in this area, as well as the borrow pits along the highway.

Our next main seat of operations was in Avoyelles parish with Marksville as headquarters and work being done on the Spring Bayou back-waters. This is a large system of waterways, covering an area approximately thirty miles long and ten miles wide, comprised of many streams, lakes and sloughs, all caused by a dam located at Lake Long, and has developed into one of the state's most productive game and commercial fishing areas. Work has been carried on in this area since the time we started almost without interruption, and will be necessary for many months to come. It has been necessary to remove some of the crews from this area from time to time to do work in other areas.

Our work has been carried on in Natchitoches parish where we removed hyacinths from Cane River, Old River and part of Bayou Derbonne. Cane River was only slightly infested, but Old River was completely matted from bank to bank. Subsequent inspections have shown that only slight reinfestation has occurred in these two streams, but will nevertheless require re-working on our part in the month of April or May. Bayou Derbonne was completely matted, but was so completely clogged with logs and other debris that our equipment could not navigate at a reasonable expense, and it is doubtful if we could have made any appreciable headway there. It is our plan to revisit this stream in the spring should the water level rise as is usually the case. In this parish we proved that it is possible to spray water hyacinths in the immediate vicinity of growing cotton or other crops WITHOUT doing damage to the latter. In some instances in this parish our work was carried on where cotton rows came almost to the water's edge where we were spraying hyacinths and no damage was done to it. Periodic inspections were made by a representative of the State Department of Agriculture and the police jury as well as our supervisory staff. The work was done throughout the entire growing season for cotton.

Other areas which have initially been worked, but will be revisited are: Black Bayou Lake, Bayou Bartholemew, Bayou Desiard in Ouachita parish, Lake Bistineau in Webster parish, Lake Martin near Lafayette, Miller's Lake near Ville Platte, Lake Concordia, Lake St. John, and Bayou Cocodrie in Concordia parish, Saline Lake, Clear Lake and Black Lake in Natchitoches and Winn parishes, as well as numerous other smaller bodies of water throughout the State.

Much experimentation and research has been carried on by this section in order to find better ways and means of spraying water hyacinths and speeding up the navigation of our floating equipment. The greatest impediment to the navigation of this equipment is the water hyacinth mat, which in some cases is from 18 inches to two feet in thickness. We have devised a type of cutter to be placed on the bow of the barge or boat which will cut a path through this mat and allow the barge to proceed at approximately 15 miles per hour. Heretofore it has been necessary for the sprayer to cut this path with a ditch-bank blade before the barge could proceed. Further, we have shown that the heavy pumping equipment can be replaced by equipment weighing 10 to 20 per cent as much, and still obtain the desired results as to application of the solution to the hyacinths. By the use of these changes in our method of operation, we feel sure of reduced costs. We also feel that the use of a helicopter and/or airplanes in the heavily infested marsh areas of the state would be the only means of ever disposing of water hyacinths in such areas.

FEDERAL AID IN WILDLIFE RESTORATION

Report of Progress

1952 - 1953

By John S. Campbell

State Coordinator, Federal Aid (Pittman-Robertson)

John S. Campbell, Federal Aid Coordinator.

In preparing this report, it is essential that a concise account be presented on each of the existing projects, and those terminated during the biennium in order to emphasize the full value of the program. To do this, each activity, under its respective heading, is treated by outlining procedure, compiling data and suggesting recommendations. Adequate charts, graphs, tables and maps have been provided to simplify the contents.

As it is a basic requirement that all Federal-Aid projects be of substantial character and design, it becomes necessary that they be listed under one of the five groups as follows:

(1) Coordination,
(2) Land development,
(3) Investigation and surveys,
(4) Maintenance,
(5) Land acquisition.

Activities for this biennium have been confined to four of this group: namely: (1) coordination; (2) land development; (3) investigation and surveys; (4) land acquisition (by lease).

Dr. Lyle S. St. Amant, Assistant Federal Aid Coordinator.

Coordination

Project 10-C, State Coordination

Coordinator: John S. Campbell
Asst. Coordinator: Lyle S. St. Amant

The coordination project has been in existence since 1946; and, due to the phenomenal growth of the Federal-Aid program since that date, it has become necessary that an assistant project leader be added to the project. This assistant was added July 1, 1951, and has been retained on the project since that date. This project will continue as long as there is justification for it.

The coordination project is responsible to the Wild Life and Fisheries Commission, for the efficient management affecting an overall wildlife restoration program. Its primary function is to coordinate all activities under Federal Aid; so as to obtain the best results, and receive the greatest benefit from moneys spent.

Projects in existence during this biennium are as follows:

NUMBER AND NAME				1952-1953	1953-1954
W-6-D-13	Farm Game Habitat Improvement			$ 60,728.00	$ 46,427.78
W-8-R-7	Wildlife Inventory and Management				12,100.00
FW-10-C-8	Coordination				
	Dingell-Johnson	$ 3,717.00	10%		
	Pittman-Robertson	33,453.00	90%	(Only P-R)	(D-J & P-R)
	Total			29,904.00	37,170.00
W-15-R-5	Mourning Dove Study			30,360.00	28,974.00
W-17-R-5	Migratory Waterfowl Investigation			29,766.00	24,200.00
W-23-D-4	Development of Wildlife Management Areas			173,187.36	130,783.69
W-24-R-4	Evaluation of Wildlife Management Practices in Louisiana			14,938.00	16,401.00
W-25-R-2	Rabbit Investigation			8,052.00	7,238.00
W-27-R-1	Squirrel Investigation				17.380.00
W-28-R-1	Investigation of Management Methods for Quail on Cut-over Pineland				11,704.00
F-1-R-2	Fish Population Investigation				27.071.00
F-2-D-1	Aquatic Vegetation Control				44.697.95
FW-1-R-1	A Statistical Survey of Game Harvest and Management Data				10.960.00
	TOTAL			$346,935.36	$415,109.42

To expedite the progress of this project and to coordinate the activities of other projects, a program has been provided whereby responsibilities and duties have been delegated to project personnel. The overall program has been arranged into two categories, namely, (1) land acquisition, development and management with C. J. Perkins in charge; (2) and research and surveys studies on game and fish with Dr. Lyle S. St. Amant in charge. In this manner, the various projects are separated into the two major phases of work, which allows for constant supervision of field personnel.

The fiscal phase of the coordination project is administered by an accountant, who is responsible for accurate disbursement of funds and for preparing reimbursement and payrolls for project personnel. A full-time secretary is assigned to the project, to handle correspondence, filing and miscellaneous details.

The volume of work assigned to the coordination project is constantly expanding because of increased annual allocations of Federal funds, for both the Dingell-Johnson and Pittman-Robertson programs, and demands for more management and development work through the state.

This black and tan is ready. He says so with this mournful pose.

Investigations and Surveys

Supervisor: Lyle S. St. Amant

Project 8-R, State-Wide Wildlife Inventory and Management Plan

Leader: Lyle S. St. Amant

Project 15-R, Mourning Dove Study

Leader: John D. Newsom
Assistant: John Haygood

Project 17-R, Migratory Waterfowl Investigation

Leader: Richard K. Yancey
Assistant: Morton M. Smith[1]

Project 24-R, Evaluation of Wildlife Management Practices in Louisiana[2]

Leader: Raymond D. Moody
Assistant: Jack O. Collins

Project 25-R, Rabbit Investigations

Co-leader: Robert L. Bryant
Co-leader: Eugene F. Hastings

Project 27-R, Squirrel Investigations

Leader: Joseph B. Kidd
Assistant: F. D. Hollis

Project 28-R, Investigation of Management Methods for Quail on Cut-Over Pineland

Leader: Robert E. Murry

Project F-W-1R, A Statistical Survey of Game Harvest and Management Data

Leader: Charles R. Shaw

Project 8-R
Wildlife Inventory and Management Plan

Project 8-R, a study of game conditions and game ranges in Louisiana, was initiated in 1946 and the final report was submitted for approval in July, 1951. This five-year study has resulted in a detailed and careful analysis of game conditions in Louisiana and the factors affecting game conditions. The report, much too long and complex to give in its entirety in this biennial, will be published in book form in the near future. It will consist of some 225 pages, numerous maps, graphs, tables, and photographs. Various phases of the results of this survey have been published from time to time and a considerable portion of the data on game censuses has been summarized in the Second Biennial Report, 1946-47, the Third Biennial Report, 1948-49, and the Fourth Biennial Report, 1950-51.

Project 15-R
Mourning Dove Study

Introduction

The *Louisiana Mourning Dove Study* was initiated on July 1, 1949 and was originally scheduled to run through June 30, 1952. A previous report covered the progress of the project from July 1, 1949 through December 31, 1951, and presented a review of the primary objectives of the project. Although the major objectives were realized by the originally intended termination date, it was deemed advisable to continue certain phases of the project for an indefinite length of time so that a constant check could be maintained on the dove population.

In addition to the above it had become apparent that a great deal of information was needed on woodcock and snipe in order that sound management recommendations could be made for these species. Since there had been very little work of any nature done on these species in Louisiana, it was essential that information be obtained on populations and movements in all areas of the state.

Consequently the project was extended for an additional three-year period and expanded to include work on woodcock and snipe. At this time the title of the project was changed from *Mourning Dove Study* to *Mourning Dove and Migratory Bird Study*.

Dove Segment

Dove Populations and Productivity

Following the severe ice storm of January 1951 the dove population hit a low point and did not recover to the high point of 1949-50 until mid-summer of 1953. However, recovery started in 1951 and was evidently nearly complete by mid-summer 1952.

Random Road Counts—It has been shown that when random road counts are made in the amount of from

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[1] Entered the Armed Services in June, 1953.
[2] Deer, turkey and oak mast investigations.

5,000 to 15,000 miles per month throughout the year a change of 10 per cent in the population can be detected from year to year. (Nelson et al. 1951.) Road counts made during the period covered by this report are presented in Table 1.

Although a higher population is indicated during September 1952 than during September 1953 it can be seen from Figure I that a generally higher population prevailed throughout the fall and winter of 1953. It is thought that these data correctly portray the dove population picture during the past two years and that the dove population was higher in 1953 than it has been since 1949-50.

TABLE I

RANDOM ROAD COUNTS

Month	No. of Miles	Doves Seen as Flocks		Singles	Pairs	Doves—100 Miles Flocks				
		No. of Occurrences	No. of Doves			No. of Occurrences	No. of Doves	Singles	Pairs	Total
1952										
January	4,318	22	444	24	10	.5	10.2	.55	.23	11.3
February	6,351	21	164	34	19	.33	2.6	.53	.29	3.7
March	10,978	11	50	33	95	.1	.45	.3	.86	2.4
April	8,267	11	109	109	191	.13	.5	1.3	2.3	6.4
May	12,604	36	173	173	495	.28	1.24	1.37	3.9	10.4
June	8,573	23	81	250	108	.26	.94	2.9	1.25	6.38
July	17,373	73	338	791	242	.42	1.94	4.55	1.39	9.28
August	17,328	105	711	902	275	.6	4.1	5.2	1.58	12.48
September	16,884	219	1,310	982	289	1.29	7.75	5.8	1.7	16.99
October	18,842	100	1,426	129	49	.53	7.56	.68	.26	8.77
November	15,005	58	464	91	42	.38	3.09	.6	.28	4.22
December	9,929	40	430	33	18	.4	4.3	.33	.18	5.0
1953										
January	11,821	39	282	49	24	.3	2.4	.4	.2	3.2
February	11,510	41	305	80	29	.3	2.6	.69	.25	3.8
March	14,350	330	184	155	75	.2	1.28	1.08	.53	3.4
April	15,287	17	68	352	181	.11	.45	2.3	1.18	5.11
May	13,006	29	148	371	205	.22	1.13	2.85	1.57	7.14
June	18,211	39	172	738	198	.2	.9	4.0	1.1	7.1
July	21,218	72	387	694	241	.3	1.8	3.2	1.1	7.3
August	22,790	143	1,216	1,091	327	.6	5.3	4.7	1.4	12.9
September	15,607	92	590	361	117	.6	3.8	2.3	.7	7.6
October	13,646	60	589	134	51	.4	4.3	.9	.4	6.0
November	10,780	60	893	75	40	.5	8.3	.7	.4	10.4
December	5,917	28	486	35	17	.5	8.2	.6	.3	9.9

Call-Road Counts—The reliability of the call-road count in indicating year to year trends of the breeding dove population has been demonstrated by Nelson et al. It has been shown that trends in the breeding dove population in Louisiana can be accurately determined by making monthly call counts over five different routes during May and June each year. Additional information concerning early and late breeding activities can be obtained by starting the counts in April and terminating them in August.

Call-road count data obtained during 1952-53 is presented in Table II. These data indicate only insignificant changes in the breeding dove population from 1952 to 1953. Therefore the indicated increase in the fall and winter dove population can only be attributed to a more successful breeding season over the entire range in 1953 than in 1952.

TABLE II—CALL-ROAD COUNTS 1952-1953

Month	Total Number Doves Heard Calling 1952	Total Number Doves Heard Calling 1953	Total Number Doves Seen 1952	Total Number Doves Seen 1953
Zone—Upper Mississippi River Floodplain				
April	21	*	9	*
May	28	*	17	*
June[1]	15 24	21	88 19	38
July	27	*	13	*
August	22	*	9	*
September	1	*	0	*
Zone—Cut-over Longleaf Pine				
April	20	32	14	10
May	6	22	7	9
June	23 37	17	15 7	19
July	12	17	18	17
August	5	*	43	*
September	0	*	13	*
Zone—Prairie				
April	3	*	4	*
May	3	9	3	2
June	4 5	5	2 12	3
July	2	6	1	7
August	2	3	8	2
September	0	*	0	*
Zone—Lower Mississippi River Floodplain				
April	2	6	3	5
May	0	6	4	3
June	5 9	4	9 6	4
July	9	9	3	9
August	5	4	14	1
September	0	*	1	*
Zone—Loblolly Pine-Hardwood Area E. of Miss. River				
April	2	7	1	2
May	9	11	4	3
June	10 2	5	2 4	1
July	3	8	1	4
August	3	1	3	1
September	1	*	1	*

Note: * No count made.

[1] Two counts were made on each route during June 1952.

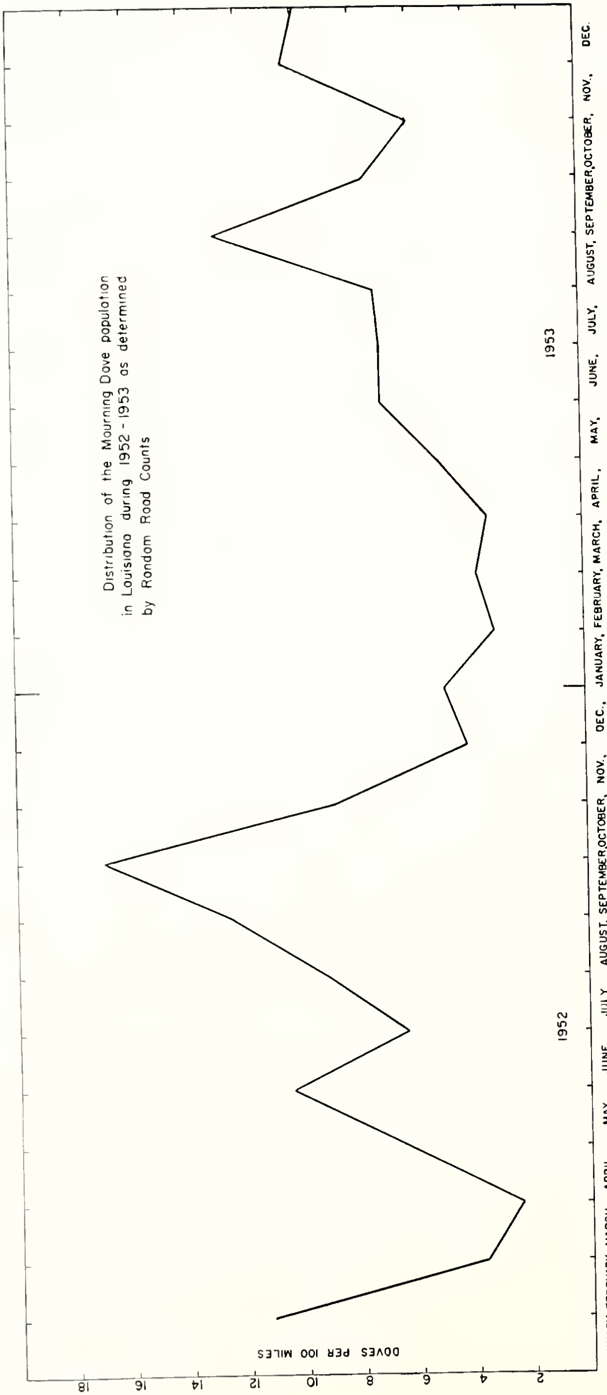

Distribution of the Mourning Dove population in Louisiana during 1952 - 1953 as determined by Random Road Counts
DOVES PER 100 MILES
2
4
6
8
10
12
14
16
18
JANUARY, FEBRUARY, MARCH, APRIL, MAY, JUNE, JULY, AUGUST, SEPTEMBER, OCTOBER, NOV., DEC.,
1952
JANUARY, FEBRUARY, MARCH, APRIL, MAY, JUNE, JULY, AUGUST, SEPTEMBER, OCTOBER, NOV., DEC.
1953

FIG. I

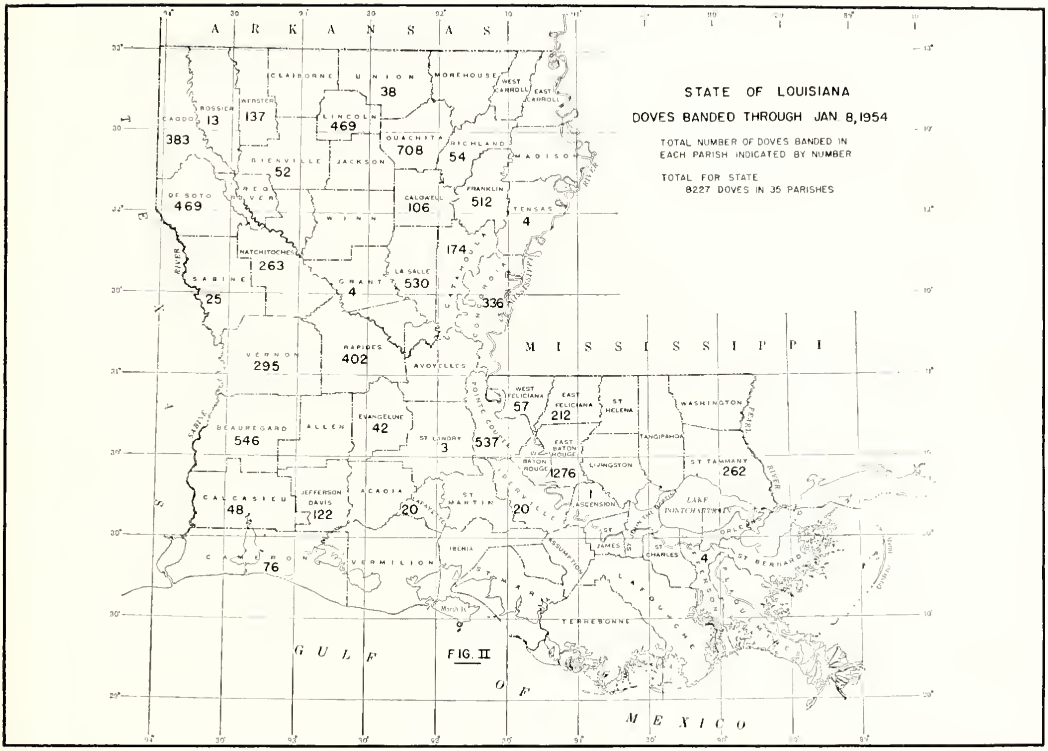


FIG. II

Dove Movements and Migrations

Prior to the period covered by this report, 3,571 doves had been trapped and banded; at the present time 8,227 doves have been trapped and banded in 35 parishes. Figure II. At this time 113 doves have been reported as being recovered during 1952-53. Table III.

Repeat captures of doves have been numerous during this period, several thousand having been obtained. A tabulation of these data could serve no useful purpose in this report; however, the information thus obtained has proven to be invaluable in designating the several segments of the year round Louisiana dove population. These data have demonstrated that there is a rather small segment of the population that may be considered to be permanent residents, since these doves have been retrapped during all months of the year. A second segment of the population and a large one is the birds that breed in Louisiana and just as soon as the breeding season is over they combine with migrant flocks of young doves from Louisiana and other areas and leave the state to winter elsewhere. The third segment of the dove population consists of birds which arrive in the state in late October-November and, for the most part, spend the winter here. The final segment of the dove population is made up of doves arriving in the state in late December-January. This segment may, in reality, be partial repetition of the segment which leaves the state in August and September each year and these birds are gradually working their way back to their breeding grounds.

Reference to Table III and Figures III and IV will give some idea as to the movements of doves to and from

* * *

—*Photo by Newsom.*

More than 7,000 doves have been banded by Louisiana biologists in the past few years.

the state. It will be noted in Table III that most of the doves recovered in Texas in September and October were banded during the spring and summer immediately prior to the time of recovery; while most of the birds recovered in states to the north are banded in the late winter or early spring prior to recovery.

Although the banding data thus far obtained have provided much needed information on the movements of doves, a great deal more information is needed in order to complete the picture, especially with regard to movements of doves within the state.

TABLE III—BAND RECOVERIES

Band No.	Where Banded	Date	How Recovered	Where Recovered	Date
	BANDED IN LOUISIANA			**KILLED IN LOUISIANA**	
513-25956	East Feliciana Ph.	3/25/51	found dead	Local	12/18/52
513-25695	E. Baton Rouge Ph.	6/17/52	killed	Local	3/10/53
513-24481	Caddo Ph.	9/ 4/51	killed	Acadia Ph.	12/21/52
513-84384	E. Baton Rouge Ph.	8/13/52	killed	Lafourche Ph.	1/ 3/53
513-88431	Natchitoches Ph.	9/15/52	shot	Local	1/ 3/53
513-69851	E. Baton Rouge Ph.	6/29/52	killed	Local	1/ 4/53
513-69434	Rapides Ph.	5/25/52	killed	Local	12/17/52
513-25687	E. Baton Rouge Ph.	3/28/52	shot	Local	12(12-16)52
513-25642	E. Baton Rouge Ph.	4/21/52	shot	Local	12(12-16)52
513-84387	E. Baton Rouge Ph.	8/19/52	killed	Evangeline Ph.	12(12-30)52
513-25355	Pointe Coupee Ph.	2/16/52	shot	Local	12/22/52
513-25366	Pointe Coupee Ph.	3/17/52	shot	Local	12/31/52
513-69055	Pointe Coupee Ph.	4/15/52	shot	Local	12/31/52
513-69707	Pointe Coupee Ph.	6/ 2/52	shot	Local	12/22/52
513 69724	Pointe Coupee Ph.	6/ 7/52	shot	Local	12/15/52
513-69775	Pointe Coupee Ph.	7/ 2/52	shot	Local	12/17/52
513-69787	Pointe Coupee Ph.	7/12/52	shot	Local	12/31/52
513-84208	Pointe Coupee Ph.	11/28/52	shot	Local	12/22/52
513-25746	E. Baton Rouge Ph.	4/28/51	shot	Calcasieu Ph.	1/10/53
513-25368	Pointe Coupee Ph.	3/17/52	shot	Local	12/15/52
49-357400	Rapides Parish	5/13/52	shot	Local	12/27/52
513-25374	Pointe Coupee Ph.	3/19/52	shot	Local	12/22/52
513-24221	Rapides Ph.	7/19/52	shot	Local	12/26/52
49-358584	Vernon Ph.	4/27/52	shot	Local	12/27/52
49-357563	Pointe Coupee Ph.	5/14/52	shot	Acadia Ph.	12/22/52
49-357860	Rapides Ph.	6/21/52	shot	Jeff Davis	12/12/52
513-69343	Rapides Ph.	8/23/52	killed	Local	12/20/52
513-25128	LaSalle Ph.	5/14/52	killed	Local	1(1-10)53
513-84378	E. Baton Rouge Ph.	8/ 5/52	shot	Local	12/15/52
513-24356	St. Tammany Ph.	10/ 3/52	shot	St. Mary	12(Dec.-Jan. 10) 1953
513-69770	Pointe Coupee Ph.	6/29/52	killed	Local	12/20/52
513-25037	St. Tammany Ph.	2/ 7/52	shot	Local	12/20/52
513-84333	E. Baton Rouge Ph.	7/23/52	found dead	Local	4/11/53
513-69508	Rapides Ph.	6/22/52	shot	Local	1/ 2/53
513-84394	E. Baton Rouge Ph.	10/28/52	found dead	Local	11/13/52
513-25218	Concordia Ph.	6/21/51	flew into train	Orleans Ph.	4/15/53
513-25253	Concordia Ph.	7/ 1/51	killed	Catahoula Ph.	1/ 6/53
513-25244	Concordia Ph.	6/30/51	killed	Catahoula Ph.	1/ 6/53
513-69468	Rapides Ph.	6/14/52	killed	Local	12/14/52
513-69001	E. Baton Rouge Ph.	6/12/52	shot	Local	12/14/52
513-25280	Catahoula Ph.	7/10/51	killed	Local	1/ 6/53
513-84317	E. Baton Rouge Ph.	7/20/52	killed	Jeff Davis	12/20/52
513-69872	E. Baton Rouge Ph.	7/ 5/52	killed	W. Baton Rouge Ph.	12/27/52
513-84853	Franklin Ph.	9/ 4/52	killed	St. Landry Ph.	12/14/52
513-69743	Pointe Coupee Ph.	6/12/52	killed	Evangeline Ph.	12/12/52
513-69608	St. Tammany Ph.	5/23/52	killed	Local	12/20/52
513-24455	Pointe Coupee Ph.	4/ 1/52	killed	St. Landry Ph.	12/28/52
513-69731	Pointe Coupee Ph.	6/ 9/52	killed	Local	12/26/52
49-358596	Vernon Ph.	5/22/52	killed	St. Landry Ph.	1/ 4/53
513-69820	E. Baton Rouge Ph.	7/ 1/52	killed	Ascension Ph.	12/10/52
49-357850	Rapides Ph.	6/21/52	killed	Local	12/28/52
513-24949	LaSalle Ph.	6/18/51	shot	Local	12/14/52
513-24373	St. Tammany Ph.	9/13/52	killed	Allen Ph.	12/23/52
513-69758	Pointe Coupee Ph.	6/15/52	killed	Evangeline Ph.	12 / 52
513-25680	E. Baton Rouge Ph.	3/21/52	killed	Local	12/12/52
513-84400	Ascension Ph.	11/24/52	shot	Local	12/16/52
513-84429	E. Baton Rouge Ph.	9/ 4/52	killed	Local	12(12-15)52
513-69419	Rapides Ph.	5/24/52	killed	Jeff Davis Ph.	12/13/52
513-88199	Concordia Ph.	4/11/53	killed	Local	12/15/53
513-69442	Rapides Ph.	5/26/52	killed	Vermilion Ph.	9(21-27)53
513-69052	Pointe Coupee Ph.	4/15/52	shot	Local	12/13/53
513-69092	Pointe Coupee Ph.	5/ 3/52	shot	Local	12/13/53
513-69095	Pointe Coupee Ph.	5/ 4/52	shot	Local	12/13/53
513-84295	Pointe Coupee Ph.	4/10/53	shot	Local	12/13/53
513-84613	Pointe Coupee Ph.	5/ 9/53	shot	Local	12/26/53
513-84633	Pointe Coupee Ph.	6/10/53	shot	Local	12/26/53
513-84622	Pointe Coupee Ph.	6/ 1/53	shot	Local	12/26/53
513-84229	Pointe Coupee Ph.	1/12/53	shot	Local	12/26/53
513-84288	Pointe Coupee Ph.	3/30/53	shot	Local	12/26/53
513-69785	Pointe Coupee Ph.	7/10/52	shot	Local	12/26/53
49-357585	Pointe Coupe Ph.	5/24/52	shot	Local	12/26/53
513-69127	Rapides Ph.	5/ 7/53	killed	Local	8/20/53
533-34562	E. Baton Rouge Ph.	8/ 9/53	killed	Local	8/18/53

	BANDED IN LOUISIANA			KILLED OUT OF STATE	
3-69532	Rapides Ph.	7/ 1/52	killed	McLennan County, Texas	9/ 6/53
3-69808	E. Baton Rouge Ph.	6/18/52	shot	Parker County, Texas	9/ 6/53
-357831	Rapides Ph.	6/15/52	killed	Travis County, Texas	9/18/53
3-24245	Beauregard Ph.	5/30/51		Travis County, Texas	9/23/53
3-88054	Franklin Ph.	4/23/53	shot	Adams County, Illinois	9/27/53
3-84963	Calcasieu Ph.	6/15/53	shot	Caldwell County, Texas	9/13/53
3-84152	Natchitoches Ph.	5/ 2/53	killed	Mason County, Illinois	9/10/53
3-36644	Cameron Ph.	8/27/53	killed	Tom Green County, Texas	9/12/53
3-34587	E. Baton Rouge Ph.	8/ 9/53	killed	Pike County, Miss.	9(15-29)53
3-34531	E. Baton Rouge Ph.	8/ 6/53	killed	Kenedy County, Texas	10/11/53
3-34935	Ouachita Ph.	9/ 3/53	shot	Dade County, Florida	10/11/53
3-69137	Rapides Ph.	5/ 7/53	shot	Refugio County, Texas	10/ 5/53
3-24988	LaSalle Ph.	4/23/52	killed	George County, Miss.	9/15/53
3-23690	Ouachita Ph.	8/ 6/53	killed	Calhoun County, Texas	10/24/53
3-23881	Ouachita Ph.	7/26/53	killed	Frio County, Texas	10/22/53
3-88699	Ouachita Ph.	8/31/53	shot	Galveston County, Texas	10/25/53
3-42105	Ouachita Ph.	10/ 7/53	shot	Galveston County, Texas	10/28/53
3-23713	Rapides Ph.	8/21/53	killed	Caldwell County, Texas	10/ 2/53
3-84113	Natchitoches Ph.	7/19/52	killed	Nacogdoches County, Texas	10 / 53
3-84213	Pointe Coupee Ph.	12/ 9/52	shot	Lake County, Tenn.	10/30/53
3-88965	E. Baton Rouge Ph.	10/ 2/53	killed	Refugio County, Texas	11/ 5/53
-358882	Webster Ph.	9/14/52	found dead	San Patricio County, Texas	11 / 52
-357022	Caddo Ph.	8/24/51	killed	Goliad County, Texas	11/15/52
3-84815	Franklin Ph.	8/25/52	killed	Gilchrist County, Florida	12/24/52
3-00080	E. Baton Rouge Ph.	5/ 6/52	shot	Galveston County, Texas	10/15/52
-330318	Franklin Ph.	8/22/52	killed	Victoria County, Texas	10/11/52
-357906	Lincoln Ph.	6/ 6/50	killed	Rockwall County, Texas	9/ 6/52
-358080	Webster Ph.	8/20/51	found dead	Miami County, Indiana	6/25/52
-358225	Caddo Ph.	8/21/51	shot	Blanco County, Texas	9/18/52
3-24536	Union Ph.	6/17/51	found dead	Cherokee County, Texas	4/21/52
3-24659	Caddo Ph.	8/28/51	killed	Liberty County, Texas	10/31/52
3-24696	Caddo Ph.	9/ 4/51	killed	Alachua County, Florida	1/10/52
3-24812	Beauregard Ph.	6/ 3/52	killed	Robertson County, Texas	9/ 1/52
3-24950	LaSalle Ph.	6/18/51	killed	Cook County, Georgia	1/ 6/52
3-25005	St. Tammany Ph.	4/ 6/51	shot	George County, Miss.	1/ 1/52
3-69478	Rapides Ph.	6/14/52	killed	Nacogdoches County, Texas	10/ 1/52
3-69752	Pointe Coupee Ph.	6/14/52	shot	Gillespie County, Texas	10/ 9/52
3-69825	E. Baton Rouge Ph.	6/28/52	killed	Kaufman County, Texas	9/ 1/52
3-84108	Natchitoches Ph.	7/15/52	killed	Live Oak County, Texas	10/16/52
3-84346	E. Baton Rouge Ph.	7/26/52	killed	Wilbarger County, Texas	9/ 7/52
	BANDED OUT OF STATE			KILLED IN LOUISIANA	
3-72327	Franklin County, Florida	10/13/52	shot	Lafayette Ph.	12/12/52
3-73659	Palm Beach County, Florida	10/ 6/52	killed	Acadia Ph.	12/18/52
3-07949	Madison County, Kentucky	7/12/52	killed	Morehouse Ph.	12/13/52
3-67074	St. Charles County, Missouri	8/24/52	killed	Jeff Davis Ph.	12/12/52
-348437	Franklin County, Florida	10/ 7/51	killed	E. Baton Rouge Ph.	1/ 3/53
-349386	Franklin County, Florida	10/13/51	shot	Ascension Ph.	12 / 51

The possession limit of mallards and a trusty old .12 gauge.

Hunting Reactions

The Louisiana dove hunting season in 1952 and 1953 opened on December 12 and closed on January 10, the bag limit has remained at eight.

During the past two years, as in previous years, data was gathered on hunting success and population composition during the hunting season by hunter bag checks. Results of these checks are given in Table IV. Since these data show a substantial increase in kill per gun hour and the number of doves per bag an increase in the dove population is indicated. Also, since the population was made up of a greater percentage of immature doves in 1953 a more successful breeding season is indicated. However, the increase could be partially attributed to a later successful nesting season.

Hunting Season Recommendations

Based on the following conclusions derived from data obtained during the course of this study it is recommended that certain changes in dove hunting regulations be requested.

1. Recoveries of banded birds indicate a population turnover of at least 70 per cent each year. Table **III**.

2. According to the data currently at hand, hunter kill can not be charged with more than five per cent of the turnover, since we have had only about a three per cent recovery of banded birds and crippling loss has not been shown to be more than half the legal bag.

3. There is an extremely large natural mortality, at least 50-60 per cent of the total population, each year.

4. There is an annual large scale movement of doves from Louisiana in late September.

5. Due to the large natural mortality and low hunter take, a major portion of the dove population is being wasted.

6. The amount of dove nesting in September is insignificant with regard to the total population.

It is clearly evident that the dove population could stand a great deal more gunning pressure than is currently being applied if this pressure is applied at the proper time during the annual cycle. Some of the methods

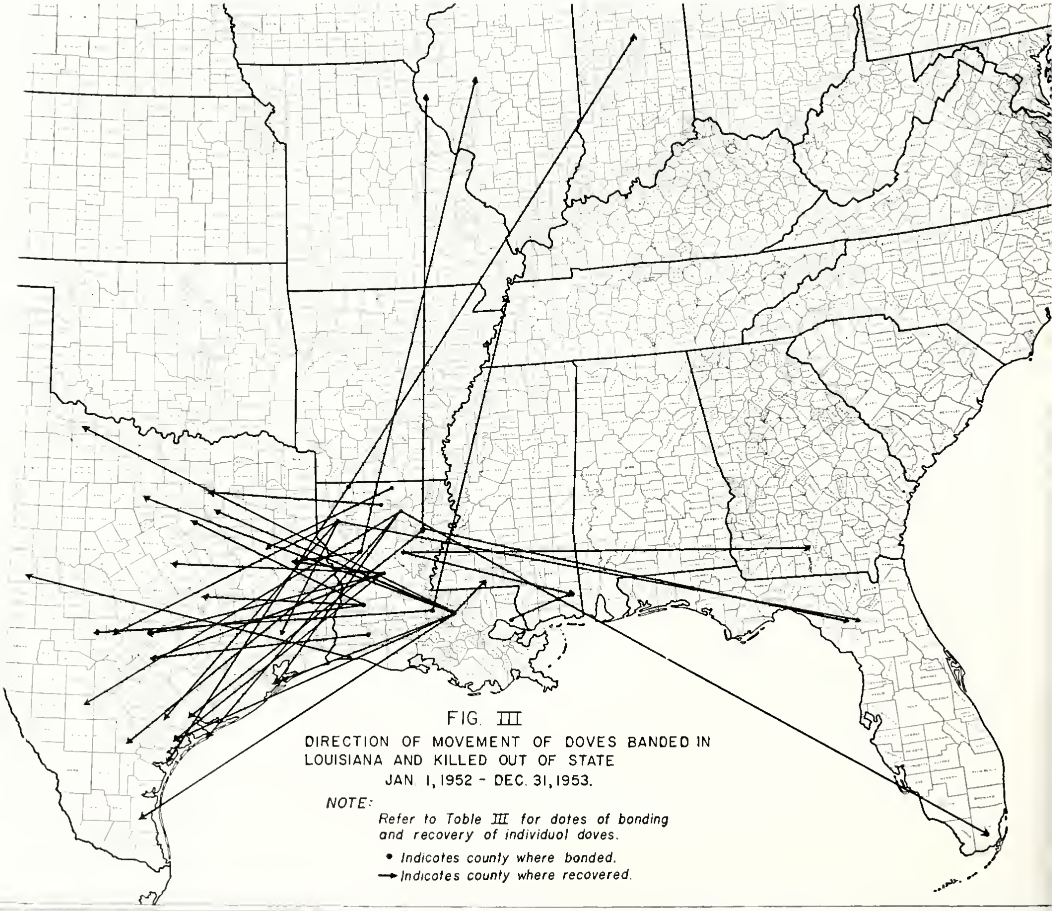


FIG. III
DIRECTION OF MOVEMENT OF DOVES BANDED IN
LOUISIANA AND KILLED OUT OF STATE
JAN. 1, 1952 - DEC. 31, 1953.

NOTE:
Refer to Table III for dates of banding and recovery of individual doves.
• *Indicates county where banded.*
→ *Indicates county where recovered.*

by which a greater harvest of the dove population could be attained are as follows:

1. Allow the dove hunting season to open on September 1.
2. Allow zoning in the state so that the season could be set in different areas of the state to correspond with the time when the greatest numbers of doves are available to the gun.
3. Substantially increase the bag limit — to at least 15.
4. Allow all day shooting.

It should be borne in mind, however, that with the advent of a relaxation of dove hunting restrictions in any manner, a very close check should be kept on the dove population so that any effect of the relaxation of restrictions could be readily determined.

It is imperative that Louisiana maintain an active program of trapping and banding, random road counts, call counts and dove hunter bag checks so that management recommendations can be based on sound up to date information.

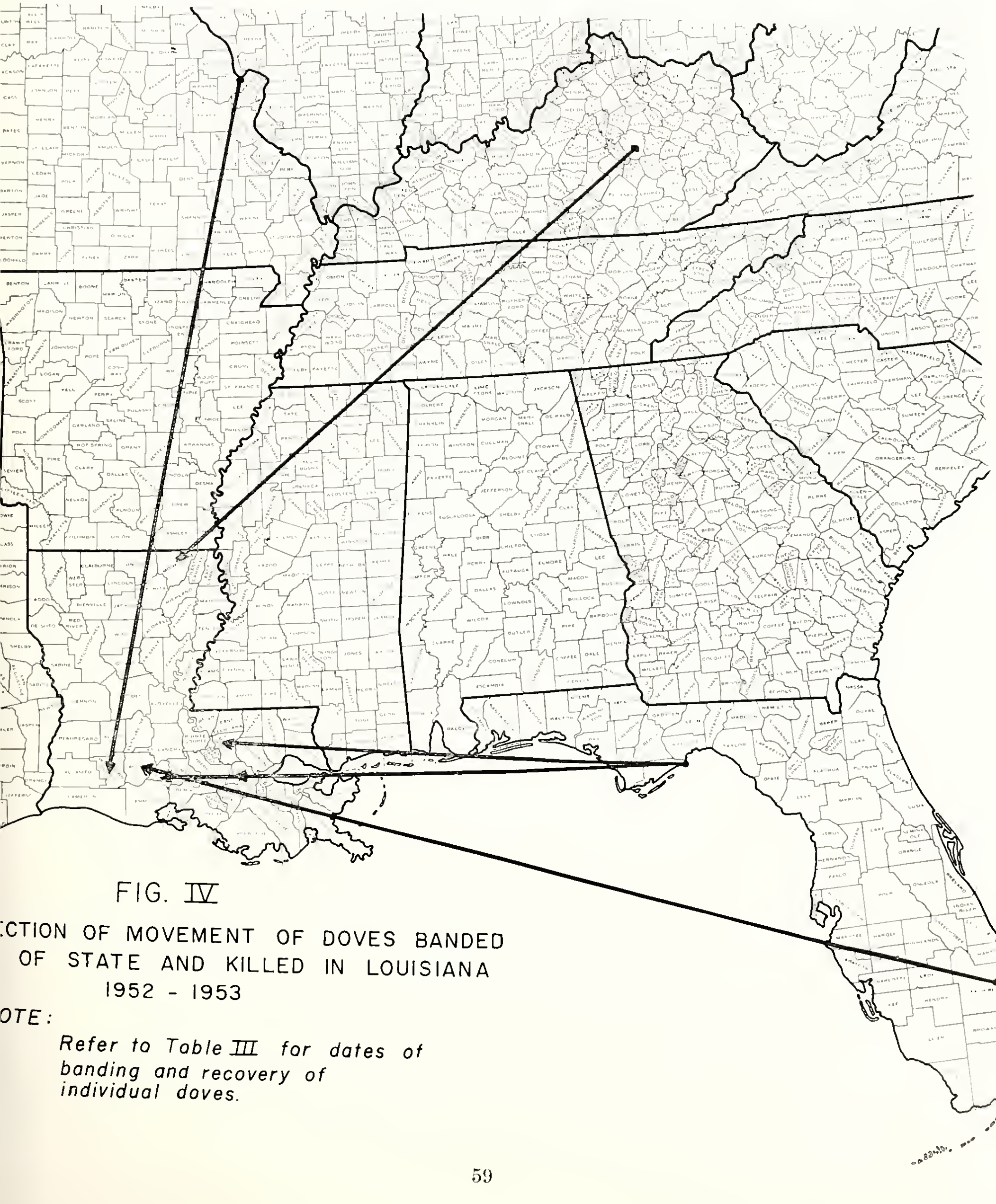


FIG. IV

CTION OF MOVEMENT OF DOVES BANDED
OF STATE AND KILLED IN LOUISIANA
1952 - 1953

OTE:

Refer to Table III for dates of banding and recovery of individual doves.

TABLE IV—POPULATION COMPOSITION AND HUNTER SUCCESS AS SHOWN BY HUNTER BAG CHECKS

(1952-1953 Hunting Seasons)

	1952	1953
Number bags checked	212	424
Total no. doves bagged	922	2042
Total no. hours hunted	496	909
No. Doves per bag	4.3	5.2
No. Doves per hour	1.8	2.24
No. adult doves	459	962
No. immature doves	180	600
No. dressed and unaged doves	283	480
Adult-Juvenile ratio	72:28	62:38
Crippling loss		
No. doves	117	339
Per Cent total bag	12.6	16.6

Woodcock Segment

The primary purpose of the woodcock segment is to obtain information on woodcock breeding, population densities, distribution and movements, hunting effects and mortality. The resulting data are to be used in making management recommendations.

The work on this segment is necessarily confined to the period each year when woodcock are present on the wintering ground (November, December, January and February), therefore the discussion to follow will be concerned only with the work completed during the winter of 1952-1953, as the current winter's work is not yet complete.

Woodcock Breeding

Since the initiation of this segment of the project authentic records of woodcock breeding have been received from the following parishes: Rapides, Natchitoche and Lincoln. The records of Rapides and Natchitoche parishes involved several broods of woodcock which suggests the possibility that woodcock breeding is mor extensive in Louisiana than it had previously bee thought to be.

Population Density and Distribution

The methods employed in attempting to determin the woodcock population density and distribution in th state were: night censuses of woodcock on feeding area and bird dog censuses in daytime cover. Data obtaine during the winter of 1952-1953 indicate that woodcoc begin to show up in the state in October, but the firs major flight does not occur until December.

Due to the severe drought of 1952 woodcock wer not normally distributed throughout the state. Quai hunters reported the complete absence of woodcock i areas in North Louisiana where in previous years the were present in good numbers. Apparently most of th woodcock were confined to the southern half of the state

Although there were heavy concentrations of woodcock observed in South and West Louisiana during January, insofar as it was possible to determine most o the wintering woodcock were gone from Louisiana b February 1.

Woodcock Banding

In order to study the movements of woodcock t and from the state and within the state a program o trapping and banding was initiated. By the use of headlights and handnets woodcock were trapped and bande on night feeding areas. During the winter of 1952-53 673 woodcock were captured and banded. At the presen time only four band recoveries have been reported Table V.

P - R leaders band woodcock — a night-time job.

ve banding is one of the more important P-R projects. is bird causes much discussion in both North and South Louisiana.

From data obtained it is evident that most of the odcock kill in Louisiana occurred in the southern one-rd of the state. However, the indications are that the al woodcock kill was of little consequence to the total pulation.

Much more work is needed on this species before y management recommendations can be offered. The rk is being continued.

ipe Segment

The original purpose of this segment of the project s to obtain information on snipe populations and move-nts and to use the data obtained in making recom-ndations as to the advisability of reopening the snipe ason. However, now that the season on snipe has been ened it is highly desirable that information be obtained the distribution and movements of the snipe popula-n throughout the wintering areas. It is also essential at data be gathered on the extent of hunting pressure d annual kill in all areas in the state in order that oper management recommendations may be made.

In attempting to develop a census method that uld reveal annual trends in the snipe population and at the same time furnish information on population distribution, two techniques were tried. Biweekly counts on areas of high snipe populations were tried on three areas and found to be inadequate. The snipe populations were found to be controlled almost completely by water level fluctuations, and far too many counts would be required in order to obtain adequate coverage of the wintering range, so that overall changes in the snipe population would be reflected. The second method, involving a widespread census of the major wintering areas within a short period of time in late January and early February offers promise of being a suitable method of annually inventorying the snipe population. This method will receive further attention in the future.

Data gathered during the past winter indicates that the major portion of the wintering snipe population arrives in Louisiana in November and remains until late February or early March. Principal snipe wintering areas are confined to the southern tier of parishes comprising the coastal marshes and the prairie of southwest Louisiana.

Although a snipe trapping and banding program was initiated during the past winter it met with little success; only 54 snipe were banded during the first winter of operation. This was due more to a lack of time than to inability to trap snipe. This activity will be continued during following years.

The 1952-53 snipe hunting season of 15 days was the first open season on snipe since 1940-41. Reports received during the open season indicate a fairly good snipe population was available to the hunters throughout the major wintering areas. However, hunting pressure was apparently extremely light in most areas.

The little fellow on the right is having trouble with his horn, but it pleases the contestant at left. They were participants in the junior horn blowing contest at Winnsboro in 1953.

TABLE V — WOODCOCK BAND RECOVERIES

nd No.	Where Banded	Date	How Recovered	Where Recovered	Date
3-93094	Pointe Coupee Ph.	1/ 6/53	found dead	Carver County, Minn.	4 21 53
3-94556	Pointe Coupee Ph.	1/23/53	killed by car	Lenawee County, Mich.	5 20 53
3-94042	Iberville Ph.	12/ 9/52	shot	Ogemaw County, Mich.	10 4 53
3-94139	Iberville Ph.	12/19 52	found dead	Kosciusko County, Indiana	10 20 53

Geese over Main Pass honk in defiance of creeping hunters.

Project 17-R

Migratory Waterfowl Investigation

Introduction

Project 17-R was first initiated on July 1, 1949, in order to gather basic information on our migratory waterfowl and their habitat in Louisiana.

The principal objectives of the project during the past two years were three-fold:

1. To conduct waterfowl inventories throughout the fall, winter and spring in order to determine the movements, migration, and distribution of waterfowl in the state.
2. To carry out a hunting pressure study in order to gather basic information about the existing and prospective waterfowl areas which could be useful in making the state more attractive to waterfowl.
3. To conduct other incidental activities which included studies of our resident wood duck and mottled duck populations and studies of lead poisoning of waterfowl on Catahoula Lake.

During 1952 two full time biologists and one part time aircraft pilot were employed to carry out this research work. In 1953 the project personnel included one full time biologist and one part time aircraft pilot.

Waterfowl Population Studies

For the past two years aerial waterfowl inventories have been conducted over the state throughout the fall, winter and spring. These censuses were made twice each
month and included the entire coastal marsh, the
fields of southwest Louisiana, Catahoula Lake, the Mis
sippi River and adjacent ox-bow lakes, the Lafour
Swamp areas near Monroe, Lake Bistineau, Black La
Saline Lake and Larto Lake.

The information gathered during four years
waterfowl inventory work indicates that all species
our waterfowl have a particular time of the fall or wir
to arrive in Louisiana. For the past four years th
migrations have been noted to occur on or about
same date and it has been impossible to link the arr
periods with any of the physical factors such as weatl
Each species apparently has a particular time to arr
during the fall and not a single deviation from the
tern has occurred as yet. The migration dates were fo
for each species as shown in Table Nos. 1, 2, and 3.

The inventory work over the past four years
shown that the distribution of waterfowl, after they h
arrived in the state, is controlled by food availabil
hunting pressure, and to a lesser degree, weather.

Within a few days after the hunting season ope
the various waterfowl populations shift from the hun
areas to the State, Federal, or natural refuge loca
closest to the most preferred food supply.

If a refuge area is not located within 25 miles
a heavily hunted feeding area, the feeding ground
be little used by ducks during the hunting season. I
rest area is to be found in the vicinity of a high qua
feeding ground, the feeding area will be heavily used
night and the ducks will return to the refuges each mo
ing at daylight.

Examples of these daily movements of ducks are to
e found throughout the state. In southwest Louisiana
e mallards and pintails rest in the Lacassine and Sabine
ational Wildlife Refuges, and the White Lake marshes
ordering the Intracoastal Canal, during the daylight
ours, and feed out in the heavily hunted rice fields at
ght. In southeast Louisiana these same species, although
nited in number since they prefer the rice fields, feed
the heavily hunted marsh areas during the night and
ove out to rest in the adjacent large lakes and pro-
cted marsh areas during the daytime. In northeast
ouisiana a good mallard population rests in the Coulee
efuge and Terzia State Refuge during the daytime
nd feeds out in Wham Brake and other shooting areas
night. In northwest Louisiana there are no resting
eas and both the mallard and pintail populations are
iven from this region shortly after hunting season
ens.

Ducks over Chicot State Park.

TABLE NO. 1

RANSECT: Bi-monthly census totals **DATE:** October 15, 1952—April 1, 1953 **SURVEY:** Aerial

BSERVER: Richard K. Yancey and Morton M. Smith **LOCATION:** Statewide

	Pintail	Mallard	Baldpate	Shoveller	Gadwall	Blue Winged Teal	Green Winged Teal	Scaup	Ring Necked Duck	Canvasback	Mottled Duck	Mergansers	Ruddy Duck	Wood Duck	Coot	Total Ducks	Blue and Snow Geese	Canada Geese	White Fronted Geese
tober 15	109,000	1,000	36,500	26,500	600	8,500	75,000		....	..	9,100		.	20,000	1,800	286,200	50,000	5,000	1,500
tober 29	212,500	190,000	75,500	49,500	94,000	450	153,500	29,000	4,300	2,400	10,400	700	3,100	20,000	47,500	845,350	350,000	10,000	2,000
vember 15	191,500	148,500	10,500	19,500	85,500	375	222,500	39,500	19,500	9,000	9,500	2,300	9,000	15,000	37,000	782,175	400,000	12,000	2,700
cember 1	90,500	202,500	10,500	15,000	60,000	....	242,500	36,500	17,000	10,000	8,200	6,900	8,500	10,000	27,500	718,100	400,000	12,000	2,700
cember 15	83,000	163,500	17,500	19,000	60,500	.	262,500	36,500	22,500	19,500	11,500	11,500	8,000	8,000	21,000	723,500	407,000	12,000	2,700
uary 1	76,000	163,000	10,150	23,200	65,300	......	234,000	36,000	18,000	16,200	11,500	10,500	8,000	10,000	19,200	681,850	100,000	12,000	2,700
uary 15	83,500	150,000	10,800	29,200	76,200	.	189,000	37,000	19,500	17,200	10,500	8,000	8,200	10,000	20,000	649,100	400,000	12,000	2,700
ruary 1	82,300	145,900	8,600	30,200	72,900	25	153,400	35,000	17,700	15,500	13,000	6,200	8,000	10,000	18,600	598,725	400,000	12,000	2,500
ruary 15	31,000	77,700	9,300	25,200	89,000	400	95,500	35,000	11,700	14,000	9,600	7,800	8,000	10,000	15,600	424,200	375,000	10,000	2,000
rch 1	17,000	91,000	23,000	27,500	83,000	2,500	81,500	38,000	17,500	11,500	8,000	5,600	8,000	7,000	15,750	420,850	350,000	10,000	1,500
rch 15	6,500	51,000	18,000	28,000	62,000	44,000	58,000	31,000	16,300	10,000	8,000	3,150	8,000	7,000	17,500	350,950	30,000	9,000	.
ril 1	1,100	3,980	10,600	21,750	22,300	111,700	11,700	26,000	3,150	3,000	5,500	3,150	4,000	7,000	27,500	234,930	5,000	3,000	......

TABLE NO. 2

LOUISIANA WATERFOWL INVENTORY DATA

October 1, 1953-January, 1954

	Pintail	Mallard	Baldpate	Shoveller	Gadwall	Blue Winged Teal*	Green Winged Teal	Scaup	Ring Necked Duck	Canvasback	Black and Mottled Duck	Mergansers	Ruddy Duck	Wood Duck	Total Ducks	Coot	Blue and Snow Geese†	Canada Geese	White Fronted Geese
tober 1	8,500	....	50	700	......	81,500	1,700	......	.....	.....	8,500	......	..	10,000	128,400		50		75
tober 15	45,000	150	5,100	3,800	...	55,300	3,500	.....	....	.....	8,500		.	11,000	132,000	9,000	13,000	1,560	700
vember 1	51,500	11,300	30,000	16,600	47,400	1,850	71,600	28,600	10,500	350	9,000	4,000	1,000	15,150	298,850	84,000	200,000	5,850	3,500
vember 15	130,000	100,000	30,500	15,700	63,000	1,000	140,000	58,000	23,000	6,000	10,000	4,200	4,000	17,000	602,400	75,000	510,900	6,000	6,000
cember 1	153,000	149,000	9,800	20,800	70,000	1,000	193,000	80,000	25,500	7,000	10,000	8,000	7,000	16,000	750,100	66,000	510,000	6,000	5,000
cember 15	242,000	320,000	5,000	16,000	68,500	500	312,000	80,000	24,500	12,000	9,000	12,000	10,500	14,000	1,126,000	66,000	500,000	6,000	3,000
nuary 6-10	406,000	263,000	5,300	17,000	73,000	500	201,500	75,000	24,000	17,000	14,000	12,000	16,500	14,500	1,139,000	60,000	495,000	4,700	1,500

*Approximately 180,000 Blue Winged Teal were found during the mid-September inventory.
†Only 6% of the total are Snow Geese.

TABLE NO. 3

STATE OF LOUISIANA, WATERFOWL MIGRATION AND POPULATION DATA

1951-1953

	Initial Arrival Date			Major Arrival (Flight) Period			30 Day Period of Highest Abundance		
	1951	1952	1953	1951	1952	1953	1951	1952	1953
Mallard	Oct. 19	Oct. 10	Oct. 17	Oct. 28-Nov. 1 Dec. 9-10	Oct. 25-Nov. 1 Dec. 6-10	Nov. 8-10 Dec. 8-12	Dec. 9 to Jan. 9	Dec. 1 to Jan. 1	Dec. 10 to Jan. 10
Pintail	Sept. 3	Aug. 28	Sept. 5	Oct. 7-20	Oct. 14-29	Oct. 15 to Jan. 10	Oct. 7-23 Dec. 10-25	Oct. 15 to Nov. 15	Dec. 8 to Jan. 8
Green Winged Teal	Sept. 22	Sept. 20	Sept. 15	Oct. 30-Nov. 5 Nov. 25-Dec. 5	Oct. 25 to Nov. 15	Oct. 25 to Nov. 15 Nov. 25-Dec. 15	Dec. 1-30	Dec. 1-Jan. 1	Dec. 10-Jan. 10
Gadwall	Oct. 8	Oct. 2	Oct. 5	Oct. 28 to Nov. 4	Oct. 25 to Nov. 1	Oct. 27 to Nov. 5	Oct. 29-Feb. 15*	Oct. 28-Feb. 15*	Oct. 29-Feb. 15*
Blue Winged Teal	Aug. 15	Aug. 13	Aug. 15	Sept. 12 to Sept. 30	Sept. 10 to Sept. 25	Sept. 12 to Sept. 28	Sept. 13 to Oct. 13	Sept. 12 to Oct. 12	Sept. 13 to Oct. 13
Baldpate	Sept. 22	Sept. 20	Sept. 25	Oct. 12-31	Oct. 10-20	Oct. 13-25	Oct. 12 to Nov. 12	Oct. 12 to Nov. 12	Oct. 20 to Nov. 20
Shoveller	Sept. 20	Sept. 15	Sept. 16	Oct. 15-Nov. 5	Oct. 10 to Oct. 25	Oct. 12-20	Dec. 1 to Dec. 30	Oct. 15-31 Dec. 25-Jan. 10	Oct. 28 to Jan. 10*
Scaup	Oct. 20	Oct. 23	Oct. 25	Oct. 28-Nov. 4	Oct. 27-Nov. 1	Oct. 29-Nov. 1	Nov. 1-March 1*	Nov. 1-March 1*	Nov. 1-March 1*
Ring Necked Duck	Oct. 23	Oct. 15	Oct. 20	Oct. 27-Nov. 3	Oct. 27-Nov. 1	Oct. 29-Nov. 4	Dec. 10 to Jan. 10	Dec. 10 to Jan. 10	Dec. 10 to Jan. 10
Blue Geese	Oct. 4	Oct. 6	Oct. 1	Oct. 20-Nov. 5	Oct. 15-Nov. 5	Oct. 15-Nov. 7	Nov. 6 to Feb. 1*	Nov. 6 to Feb. 1*	Nov. 8 to Feb. 1*
Canada Geese	Sept. 28	Sept. 25	Oct. 3	Oct. 10-Nov. 1	Oct. 8-Nov. 1	Oct. 15-Nov. 1	Nov. 1-March 1*	Oct. 30-March 1*	Oct. 30-Feb. 1*

*Period of same abundance.

These local movements of ducks from the refuge concentration are frequently mistaken by hunters as new migrations of ducks. Immediately following the hunting season the refuge waterfowl concentrations break up and disperse to the feeding areas and there they remain until the spring migration. At this time the hunters who happen to see these ducks arrive on the hunting grounds think that a new migration of waterfowl has moved into the state, whereas it is actually only a shift from the refuge to the feeding grounds. The Lacassine and Sabine National Wildlife Refuges and the White Lake marsh generally contain an average of 500,000 ducks during the daylight hours of the hunting season. Within three days following the end of the hunting season only 10,000 or so mallards and pintails are to be found at any time on these areas.

The chief duck concentration areas in the state during the two past years were the rice fields of southwest Louisiana, the Lacassine National Wildlife Refuge, the Rockefeller Refuge, the Lake Borgne marshes, the marsh area west of Buras bordering Yellow Cotton Bay, and the Delta National Wildlife Refuges.

The chief goose concentration areas were found in the coastal marsh areas of southwest Louisiana, Marsh Island, Point Au Fer, the Lake Decade marshes, the delta areas at the mouth of the Mississippi River, and the Bayou Biloxi marshes east of Delacroix. The only wintering population found in north Louisiana was a few small flocks of Canada geese along the Mississippi River.

Waterfowl Kill Data

The waterfowl kill in Louisiana was measured by a system of hunter bag checks during the 1952 and 1953 duck season. The data gathered was obtained by checking duck, goose and coot hunters at road intersections, boat landings, and public ferries. The same check stations have been maintained throughout the past three hunting seasons in order to detect changes in the annual kill. These changes are then useful in determining the best time for hunting season.

The kill data is also useful in disclosing the amount of shooting pressure received by each species, the average kill per hunter per day and the crippling loss over the various hunting areas in the state.

The 1952 hunting season extended from November 5 to December 29, while the 1953 season extended from November 17 to January 10. A total of 13,086 bag checks were made during the 55 day 1952 hunting season, while 11,825 checks were made during the 1953 season. The data collected during the two hunting seasons are shown in Tables Nos. 4, 5, 6, and 7.

The total average waterfowl kill per hunter per day was slightly higher during the late 1953 hunting season than it was during the early 1952 season. The kill was higher in southwest Louisiana and central Louisiana, approximately the same in north Louisiana and less in southeast Louisiana during the 1953 season. The goose and coot kill average was almost twice as high during the late 1953 hunting season.

A close comparison of the waterfowl kill figures and census data reveals a wide discrepancy in the species percentages. The mallard population normally makes up only 20% of the total and about 50% of the kill. The green-winged teal population, our most numerous species, comprises 33% of the total and 9% of the kill. The pintail population, also one of our most numerous species, normally makes up only 8% of the total kill. The hunter bag checks reveal that the blue-winged teal population is escaping each year without being harvested at all. The bag check data also reveals the fact that the blue goose population is being gunned very lightly. It is estimated that not more than 30,000 of the 500,000 blue and snow geese wintering in Louisiana were harvested by hunters.

TABLE NO. 4

WATERFOWL HUNTERS' BAG CHECKS

STATE OF LOUISIANA, NOVEMBER 5, 1952-DECEMBER 29, 1952

	Statewide Totals	Northwest Louisiana	Northeast Louisiana	Central Louisiana	Southwest Louisiana	Southeast Louisiana
Number Bag Checks	13,086	1,660	3,137	590	5,293	2,406
Number Ducks Checked	19,337	2,475	3,685	391	8,099	4,687
Average Ducks Killed—man/day	1.48	1.49	1.17	66	1.53	1.95
Number Geese Checked	1,833	0	0	2	1,796	35
Average Goose Kill—man/day	14	0	0	trace	34	01
Number Coots Checked	2,129	100	0	0	32	1,997
Average Coot Kill—man/day	16	06	0	0	trace	83
Number Waterfowl Checked	23,299	2,575	3,685	393	9,927	6,719
Average Waterfowl Kill—man/day	1.77	1.50	1.17	66	1.87	2.79

TABLE NO. 5

SPECIES KILL

19,337 DUCKS

PER CENT OF TOTAL

Species	Statewide	Northwest Louisiana	Northeast Louisiana	Central Louisiana Catahoula Lake	Southwest Louisiana Coastal Marshes	Southeast Louisiana Coastal Marshes
Mallard	50.0	45.1	55.7	26.0	55.8	39.5
G. W. Teal	10.9	9.6	6.0	7.2	10.5	16.3
Pintail	8.3	7.6	3.0	56.0	9.7	7.1
Wood Duck	7.4	12.0	28.2		8	1
Gadwall	6.0	1.8	8	1.0	6.0	12.6
Scaup	5.5	9.9	1.0	2.6	3.0	11.3
Ring Necked	2.6	10.5	2.5	1.0	9	1.6
Shoveller	2.6	4	4	4	4.2	2.7
Mottled Duck	1.9				3.7	1.7
Baldpate	1.7	trace	.3	1.5	3.0	1.3
B. W. Teal	9	1.5	8	2.0	6	1.0
Mergansers	6		trace		5	1.7
Black Duck	5	trace	3		1.0	4
Redhead	4	6	2	trace	1	9
Canvasback	3	.4	trace	2.1	1	5
Ruddy Duck	3	.4	4		trace	8
Other	trace				trace	trace

GEESE

1,833 EXAMINED

PER CENT OF TOTAL

Blue Geese	83.8				84.1	100.0
Snow Geese	9.5				9.4	
Canada	5.9			100.0	5.8	
White-Front	.8				.7	

TABLE NO. 6

WATERFOWL HUNTERS' BAG CHECKS

STATE OF LOUISIANA, NOVEMBER 17, 1953-JANUARY 10, 1954

	Statewide Totals	Northwest Louisiana	Northeast Louisiana	Central Louisiana	Southwest Louisiana	Southeast Louisiana
Number Bag Checks	11,825	1,517	1,789	1,413	5,357	1,749
Number Ducks Checked	16,843	2,170	2,032	1,309	8,724	2,608
Average Ducks Killed—man/day	1.43	1.43	1.14	93	1.63	1.5
Number Geese Checked	2,842	4	2	31	2,782	23
Average Goose Kill—man/day	24	0	0	022	52	trace
Number Ducks and Geese Checked	19,685	2,174	2,034	1,340	11,506	2,631
Average Duck and Goose Kill—man/day	1.7	1.43	1.135	941	2.15	1.5
Number Coots Checked	3,071	0	82	0	187	2,802
Average Coot Kill—man/day	26	0	045	0	039	1.6
Total Number Ducks, Geese and Coots Checked	22,756	2,174	2,116	1,340	11,693	5,433
Total Waterfowl Kill—man/day	1.93	1.43	1.18	941	2.2	3.11

TABLE NO. 7

SPECIES KILL
16,843 DUCKS CHECKED
PER CENT OF TOTAL

Species	Statewide	Northwest Louisiana	Northeast Louisiana	Central Louisiana	Southwest Louisiana	Southeast Louisiana
Mallard	47 0	46 6	64 7	47 5	48 3	22 0
Green Winged Teal	8 5	4 1	7 7	9 6	10 0	8 5
Pintail	8 8	8 3	2 2	29 6	8 0	4 0
Wood Duck	4 1	8 3	20 3	4	2	0
Gadwall	7 8	3 2	1 0	2	8 9	25 2
Scaup	8 6	10 0	1	8 3	6 3	24 5
Ring Necked	3 3	17 8	2 4	1	8	7
Shoveller	4 3	.1	3	1.1	7 5	2 0
Mottled Duck	1 2	0	.0	0	2 1	1 0
Baldpate	2 3	.3	0	8	3 5	3 0
Blue Winged Teal	1.3	9	5	.9	1 7	1 8
Mergansers	.5	.2	0	.2	8	1 2
Black Duck	.7	.3	.5	1	1.1	.6
Redhead	.3	.1	.1	0	2	1 7
Canvasback	.4	.3	.1	1 2	.2	1.8
Ruddy Duck	.5	.1	.1	.0	.3	1.8
Other						

GEESE
2,836 CHECKED
PER CENT OF TOTAL

Blue Geese	88 5	Trace	Trace	90 3	87 5	76 0
Snow Geese	10 4		..	3 2	10 2	20.0
Canada Geese	1 6			6 5	1 5	4.0
White Front	.6				.6	

Louisiana Waterfowl Habitat

During the past four years most of the various waterfowl areas in the state have been investigated. These investigations have revealed a critical need for acquisition, by the state, of existing waterfowl areas plus other lands suitable for development as such. Approximately 75,000 duck stamps are sold annually in Louisiana and the areas open for the average duck hunter are becoming non-existent in the coastal marshes and nearly so in north Louisiana.

Acquisition and development of lands suitable for use as public shooting areas should be undertaken in the coastal marshes, the Atchafalaya Basin, the La Fourche Swamp near Monroe, and the Bayou Bodcau basin north of Minden which could easily be developed. A program such as this will be necessary if duck shooting is to continue as a public sport and if the overcrowded conditions are to be alleviated in the areas open at this time.

Catahoula Lake continues to be the most important single waterfowl area in the state. Its loss could not be compensated for and the U. S. Corps of Engineers presently has a plan which would destroy the lake for waterfowl if placed into effect. Such areas as this are irreplaceable and every effort should be made to maintain this lake in its natural state.

There is also a critical need for close planning with the various agencies who are engaged in drainage. In northeast Louisiana these activities have almost completed the destruction of our swampland waterfowl habitat and efforts should be made to curtail these practices. Brakes, sloughs and lakes which could never be farmed have been foolishly drained in this region and this is important from both an economical as well as a recreational point of view. In the Monroe-Bastrop area dozens of these areas were drained years ago and are now valueless. They were never farmed and they should be re-developed as waterfowl areas.

In the coastal marshes there is a need for close planning with the various corporations and agencies engaged in cutting access canals. Salt water intrusion can be extremely detrimental to waterfowl habitat and coordinated planning would be useful in reducing the damage.

In southwest Louisiana animal factors are creating gross changes in the waterfowl habitat. The nutria popu-

Richard Yancey and Robert Murry, P-R men, rig the cannon projecting net to trap migratory waterfowl.

lation has denuded large acreages of the valuable blue goose range in the Audubon Refuge and is currently affecting Marsh Island and other marsh areas. These denuded areas, when flooded out by water, were heavily used by green-winged teal and other lesser ducks during 1952 and 1953, but the blue geese had to search for suitable range elsewhere. Every consideration should be given to the preservation of each acre of blue goose range, since Louisiana is responsible for wintering 95 per cent of the entire population. If the blue goose range is destroyed it is reasonable to assume that the species could disappear since it would probably be unable to adapt itself in other regions. More liberalized trapping regulations may partially answer the nutria damage problem and a study should be made of the possibility.

Cattle grazing is also creating changes in the waterfowl habitat of southwest Louisiana and this factor is oftentimes beneficial. The dense stands of sawgrass are unsuitable for use by either ducks or geese and cattle grazing has in many cases aided in opening up such stands of marsh for waterfowl. In areas where grazing can be controlled it can be a valuable tool in managing a marsh for waterfowl.

Weed problems are currently becoming more intense over the state as exotics such as alligator weed and water hyacinth increase in range. At present, alligator weed has spread through the fresh water areas of the coastal marshes from the mouth of the Mississippi west to the Sabine Lake and north to Bastrop. Water hyacinths have also spread through the fresh water areas of the state. These plants shade out the aquatic food plants in ponds or lakes and are continually in need of control. Valuable waterfowl areas such as Lake Theriot, south of Houma, are being reduced in value by these plants and preventive control measures should be undertaken as soon as such problems occur, not after a lake has already been covered.

Louisiana's waterfowl habitat offers one of the primary considerations in setting the hunting seasons. A large number of waterfowl hunting areas do not have water until late in the winter and many of the hunters will not have a place to hunt if the season closes early. Most of the hunting areas have water late in the winter and hunting seasons ending on or about January 10, the latest date allowed by the U. S. Fish and Wildlife Service, will insure the fact that they can be used.

Project 24-R
Evaluation of Wildlife Management Practices

Introduction

Four distinct phases of work are covered in this report as follows: Research on deer, turkey, squirrel and acorn mast production.

A representative of the United States Fish and Wildlife Service (Vincent H. Reid) is cooperating with project 24-R on the deer browse survey of the Red Dirt National Wildlife Refuge. Included in this survey is a special project of browse studies and vegetation changes in two separate 40-acre deer corrals. Mr. Reid is also cooperating in the acorn study on Red Dirt.

The turkey work for 1952-1953 was limited to three refuges. The three refuges where turkey investigations were conducted are Red Dirt, Catahoula and Union. As of July, 1953, three additional game management areas were added as follows: West Bay, Grant-Rapides and Caldwell.

Research on squirrels was initiated under project 24-R with Union, Catahoula, Evangeline, Grant-Rapides, Sabine and West Bay constituting the principal refuges where this work was conducted. Flavil D. Hollis headed the trapping operations with the "Refuge Managers" of their respective refuges doing the actual trapping and recording of information.

The deer work presented in the report consists of a browse survey, changes of vegetation determined by use of exclosures, and mapping vegetation present and amount of browse on each species in the 16-foot square permanent plots, on both the Catahoula and Red Dirt National Game Management Areas. A deer population index was determined by track count and number of deer observed on Red Dirt, and number of deer observed only on Catahoula over a predetermined route and an established period of time. A browse survey was conducted in the south 40 acres of the deer corral in March, 1953.

Twenty permanent plots each in the south 40 acres and north 40 acres of the deer corral were checked for species and height class at this time.

A second browse survey was conducted in both deer corrals again in June, 1953, and a third survey in the south 40 acres of the deer corral was made in October, 1953.

Additional work on the deer phase was initiated since the annual report of July, 1953. This includes the weights, ages and antler formations as determined by kill data, from several different clubs in Madison and Tensas Parishes.

Deer Studies—Red Dirt Game Management Area

Deer Population Index

A deer index, which includes both deer sighted and number of tracks counted, was run on this area for a 10 day interval each January and August since 1951.

During this check, tracks were counted on a predetermined route over a 24-hour interval. After the tracks were recorded the imprints were erased from the road bed.

In 1951, when the index was first initiated, a total of three deer were observed and 3.07 tracks per hour per day were recorded for the 31 mile check run, as compared to 52 deer sighted and 8.92 tracks per hour per day being recorded for the same period in 1953. See Table I for comparison figures over the three-year study period.

The deer track count, or deer index, conducted in August of each year was broken down into adult tracks and fawn tracks. The track count in August, 1953, was made over a six-mile route, distributed at one mile intervals, over the six roads previously traveled for a total of 31 miles.

Fawn tracks comprised 28 per cent of the total tracks recorded in 1951, 25 per cent in 1952 and only 10 per cent in August, 1953. See Tables II and III.

Deer Browse Studies

The last annual deer browse survey of Red Dirt was conducted in March of 1953. In addition to the regular random survey, an 80-acre deer corral, which is representative of the entire area, was also surveyed. This deer corral, set up in 1951 to secure pertinent data on deer, is comprised of approximately 80 acres with a cross fence through the middle, dividing it into two 40-acre tracts. These tracts are referred to as the North and South 40 deer corrals.

The original plan was and is to place one doe and one buck in one of the forties, and two does in the second forty.

From this arrangement intensive observations will be made on deer food habits, browse intensity and breeding habits. Thus far, because of a failure to get reproduction and because some difficulty has been experienced in keeping the proper number of deer alive, only the browse studies have been successful. The results of which are as follows.

A browse survey of the south 40 was conducted in March, 1953, which included 20 permanent plots and 50 random sample plots. The Aldous method was used in this check, and 1/100 acre plots were taken at every 2½ chain intervals.

Fifty random sample plots, 20 permanent plots included, within the south 40 deer corral, showed a minimum browse index of 1.66 on water oak *(Quercus nigra)* to a maximum of 225 on hawthorn. Disregarding hawthorn, considered unimportant due to a low density figure and per cent of browse available, the next plant with the highest index of browse was yaupon *(Ilex vomitoria)*, with a browse index of 218. See Table IV. Excluding hawthorn, six plants were found to have been browsed in excess of the 100 figure, set by Krefting as being in the danger zone, in the south 40, based on 50 1/100 acre samples. Wax myrtle showed an exceptionally high figure, in the per cent food eaten column with 9.0 per cent. It must be remembered that this is the first winter browse survey in this particular area, and no comparison figures are available. However, previous surveys on Red Dirt and Catahoula showed wax myrtle to be unworthy of mention as a deer food. Gallberry *(Ilex coriacea)*, redbay *(Persea palustris)*, yaupon and greenbrier *(Smilax spp.)* made up approximately 58 per cent of the food eaten. This is taking into consideration the 23 species of plants found to have been browsed in the south 40 deer corral.

In addition to a deer browse survey in the south 40, twenty permanent plots in each 40-acre corral, one mill acre in size, were checked as to species, number of stems, and height class of the vegetation present. This was also accomplished in March 1953. A total of 25 species of plants utilized by deer was recorded for the north 40. See Table V. Only 20 species of plants were recorded as

TABLE I

DEER INDEX ON THE NATIONAL RED DIRT GAME PRESERVE

For the January Period—1951, 1952, and 1953

January 1951			January 1952			January 1953		
Day of Month	Deer Seen	Tracks Recorded	Day of Month	Deer Seen	Tracks Recorded	Day of Month	Deer Seen	Tracks Recorded
8		44	8		160	13	1 buck 2 doe 2 fawn	350
9		24	9	5	109	14	2 doe 1 buck 7 sex unknown	233
10		19*	10		79	15	1 buck 2 doe 3 fawn	237
11		54	11		123	16	1 buck 1 doe 2 fawn	173
12	1 spike buck	24†	12	1	78	17	3 sex undetermined	240
13		37	13		69	18		137
14		13††	14	2	122	19	1 buck 3 doe	190
15		54	15		106	20	3 buck 3 doe 2 fawn	223
16		58	16		108	21	2 sex undetermined	188
17	2 does	80	17		126	22	3 doe 4 fawn 3 sex undetermined	168
TOTAL—10 days	3	417	TOTAL—10 days	8	1,080	TOTAL—10 days	52	2,139
AVERAGE	3	41.7	AVERAGE	8	108	AVERAGE	5.2	213.9
Average Tracks/hr. per day		3.07			4.50			8.92
Deer seen/mi. driven	1 deer per every 103.33 mi.			1 deer per every 38.75 mi.			1 deer per every 5.96 mi.	

*Number tracks over 5 hr. period. †Number tracks over 3 hr. period. ††Number tracks over 4 hr. period.
Number of tracks marked with asterisks were low due to rain on previous nights.

being present in the permanent plots of the south 40 deer corral. These ranged in number of total stems for all classes, (20 plots), from a minimum of one stem for water oak and maple leaf viburnum *(Viburnum acerifolium)* to a maximum of 156 stems on azalea *(Rhododendron canescens)*. See Table VI. The total number of stems, for all plots and size class, ranged from a minimum of one yellow jessamine *(Gelesemium sempervirens)* to a maximum of 141 stems of wax myrtle, in the north 40 deer corral.

One doe was present in the south 40 at the time of this survey, whereas no deer were present in the north 40. A later deer browse survey was made of both the north and south 40 deer corral, in June, 1953. The reason for deleting the north 40 from the survey in March, was because no deer were present in the area at that time.

The last survey (October 28, 1953) was again limited to the south 40 deer corral, due to the absence of deer in the north 40. Only two plants, gallberry *(Ilex coriacea)* and greenbrier *(Smilax spp.)*, had a browse index worthy of mention in the June survey. Based on 50 random sample plots, these two plants had a browse index of 87.5 and 85.0 respectively. Virginia willow *(Itea virginica)* was the only plant with a significant browse index (93.5) in the October survey.

None of the plants was browsed extensively. It is believed that grazing by deer is more prevalent than browsing, this season of the year. Feeding sign was noted, in several instances, on grasses and forbs.

TABLE II—DAILY RESULTS OF DEER TRACK COUNT ON RED DIRT REFUGE OVER PRE-DETERMINED ROUTE

For August 1951 and 1952

DATE	AUGUST 1951		AUGUST 1952		TOTALS	
	Number Adults	Number Fawns	Number Adults	Number Fawns	1951	1952
6	53	12			65	
7	80	21	106	41	101	147
8	86	19	128	41	105	169
9	55	18	117	18	73	135
10	59	23	70	22	82	92
11	60	14	114	33	74	147
12	43	16	95	25	59	120
13	31	6	159	28	37	187
14	45	20	132	27	65	159
15	74	16	97	32	90	129
16			89	10		99
Total	586	165	1107	277	751	1384
Tracks/hr. per day					3.179	5.766

TABLE III—DEER TRACK COUNT ON RED DIRT NATIONAL WILDLIFE REFUGE— AUGUST, 1953

(Six Mile Route)

Date	No. Adult Tracks	No. Fawn Tracks	Total Tracks	Deer Seen
8-11-53	49	6	55	0
8-12-53	49	4	53	0
8-13-53	74	7	81	0
8-14-53	47	6	53	0
8-15-53	54	1	55	0
8-16-53	54	4	58	0
8-17-53	43	10	53	2 Sex Unknown
8-18-53	36	8	44	0
8-19-53	68	2	70	0
8-20-53	48	6	54	0
Total....	522	54	576	2

TABLE IV

DEER BROWSE SURVEY FIGURES OF 50 RAMDOM SAMPLE PLOTS MADE IN THE SOUTH 40 DEER CORRAL MARCH 17, 1953

Browse Species	Per Cent of Plots Present	Average Density	Average Degree of Browsing	Utilization Factor	Per Cent of Food Eaten	Per Cent of Browse Available	Browse Index
Azalea	18	1 5	90	1 35	7	9 20	2 22
Alder	4	.10	0 00	0	0	61	0
Blackberry	16	16	20 00	3 20	1 7	97	50 00
Blackgum	8	12	1 75	21	1	73	4 37
Chokeberry	6	08	1 70	14	07	49	4 16
Dogwood	44	3 76	4 14	15 56	8 1	22 95	10 34
French Mulberry	4	06	72 50	4 35	2 27	37	131 25
Gallberry	4	.60	74 0	44 40	23 23	3 66	185 00
Greenbrier	8	24	38 5	9 24	4 83	1 46	96 25
Hawthorn	2	02	90 0	1 80	94	12	225 00
Huckleberry	54	4 32	1 52	6 56	3 43	26 37	3 80
Sassafras	8	14	23 00	3 22	1 68	85	57 50
Maple	8	20	12 50	2 50	1 31	1 22	31 25
Sumac	16	36	3 13	1 13	59	2 20	7 81
Possumhaw	12	38	9 00	3 42	1 79	2 32	22 50
Redbay	10	54	58 60	31 64	16 55	3 30	146 50
St. Andrews Cross	20	20	27 00	5 40	2 82	1 22	67 50
Sweetgum	24	96	5 33	5 12	2 68	5 86	13 33
Virginia Willow	2	.02	60 00	1 20	63	.12	150 00
Water Oak	6	08	67	05	03	49	1 66
Wax Myrtle	24	1 86	9 25	17 21	9 00	11 35	23 12
Witch Hazel	8	22	0	0	0	1 34	0
Whitebay	6	14	1 33	19	09	85	3 33
Yaupon	4	12	87 50	26 25	13 73	73	218 70
Yellow Jessamine	2	02	0	0	0	12	0
Fringe Tree	2	.10	70 00	7 00	3 70	61	175 00
Holly	2	08	0	0	0	49	0
TOTAL		16 38		191 14			

TABLE V

TOTAL NUMBER OF STEMS BY SPECIES AND HEIGHT CLASS AS RECORDED FOR 20 PERMANENT ONE MILL ACRE PLOTS IN THE NORTH 40 DEER CORRAL ON THE RED DIRT GAME REFUGE

MARCH 18, 1953

Species	Height Class (ft.)				Total No. Stems for all Classes
	0–2	2–4.5	4.5–7	7–12	
Alder	8	10	5	1	24
Azalea	72	1	0	0	73
Blackberry	7	0	0	0	7
Blackgum..	2	4	1	2	9
Chokeberry..	14	4	2	0	20
Dogwood ...	22	4	5	3	34
Gallberry..	32	27	3	3	65
Greenbrier.	9	3	7	4	23
Holly..	7	0	0	0	7
Huckleberry..	2	9	4	0	15
Maple.	3	0	0	0	3
Possumhaw ..	6	8	2	2	18
French Mulberry.	0	7	20	0	27
Redbay.	12	3	0	5	20
Sassafras ..	1	1	0	0	2
Sweetgum...	0	1	1	1	3
Sweetleaf ...	0	2	0	0	2
Sumac.	0	3	4	1	8
Virginia Willow	4	1	1	0	6
St. Andrews Cross	5	0	0	0	5
Wax Myrtle.	90	50	0	1	141
Whitebay....	22	14	13	5	54
Witch Hazel..	5	25	0	0	30
Yaupon..	2	9	1	1	13
Yellow Jessamine.	1	0	0	0	1

TABLE VI

TOTAL NUMBER OF STEMS BY SPECIES AND HEIGHT CLASS AS RECORDED FOR 20 PERMANENT ONE MILL ACRE PLOTS IN THE SOUTH 40 DEER CORRAL ON THE RED DIRT GAME REFUGE

MARCH 18, 1953

Browse Species	Height Class (ft.)				Total No. Stems for all Classes
	0–2	2–4.5	4.5–7	7–12	
Alder	5	0	1	0	6
Azalea	129	16	9	2	156
Blackberry	7	0	0	0	7
Chokeberry...	4	1	0	2	7
Dogwood ..	44	24	13	3	84
French Mulberry .	13	0	0	0	13
Gallberry	9	8	2	9	28
Greenbrier	3	0	4	0	7
Huckleberry	13	15	19	0	47
Maple Leaf Viburnum	1	0	0	0	1
Fossumhaw	1	1	2	1	5
Redbay	6	5	5	0	16
Red Maple	8	6	2	1	17
Sassafras	5	4	0	0	9
Sweetgum .	7	2	0	0	9
Sumac	0	1	4	4	9
Water Oak	1	0	0	0	1
Wax Myrtle.	54	20	2	2	78
Witch Hazel	1	4	1	0	6
Yaupon..	0	4	0	0	4

The overall deer browse survey, consisting of 700 random sample plots, run annually on the Red Dirt National Wildlife Refuge, represents a cross section of the entire area and is designed to determine the amount and condition of deer foods on the refuge.

Approximately 8,000 acres of Red Dirt is leased to grazing. The balance of the area, or approximately 32,000 acres is free from stock. Of the 700 random sample plots taken each year, 200 are made in the cow pasture and 500 plots are taken on the stock-free area.

Greenbrier and whitebay *(Magnolia virginiana)* seemed to be the most palatable plants browsed in the March survey of 1951. The plant nearest approaching the danger zone was greenbrier, with a browse index of 72.9. Twenty-four species of plants were recorded as having been browsed at the time of this survey.

The 1952 browse survey showed a total of 26 species of plants to have been browsed. Three species of plants, Virginia willow, sweetleaf *(Symplocos tinctoria)*, and fringetree *(Chionanthur virginica)*, had a browse index in excess of 100. Again, as in 1951, greenbrier had a relatively high index of 71.9.

Greenbrier, whitebay, virginia willow, sweetleaf and fringetree appeared to receive the brunt of the browsing in 1952.

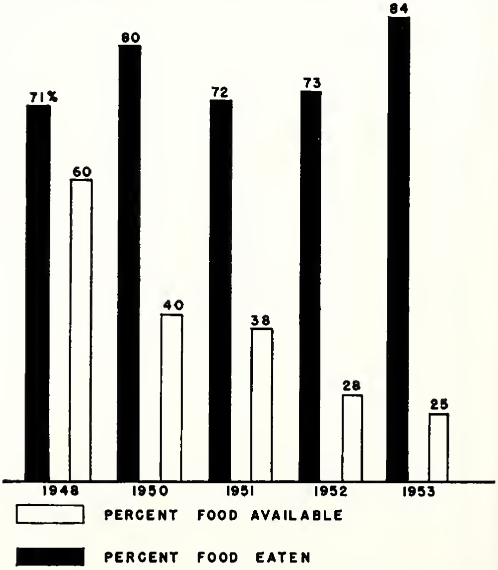
Only two plants were found to have been browsed for an index in excess of 100, based on the 700 random sample plots in the March, 1953, survey. The two plants overbrowsed were gallberry and fringetree, with a browse index of 143 and 134 respectively. Twenty-nine species of plants were found to have been browsed in 1953 as compared to 26 species in 1952 and 24 species in 1951.

To sum up the results of the browse surveys, over a five-year period, on the Red Dirt National Wildlife Refuge, it could be safely stated that the per cent of food eaten, by species, has steadily increased; while the per cent of food available has gradually declined. See Table VII for comparison figures on per cent of food eaten and available.

The following nine species of plants were found to have furnished 84 per cent of the total food eaten as determined by the 1953 survey: Greenbrier, whitebay, blackgum, Virginia willow, sweetleaf, yaupon, french mulberry, gallberry and fringetree. From 1948 through 1953 the per cent of food eaten, based on the above mentioned

DIAGRAM I

PERCENTAGE OF FOODS EATEN & AVAILABLE BASED ON NINE PLANTS MOST UTILIZED.



plants, jumped from 71 per cent to 84 per cent or a total increase of 13 per cent. At the same time, the per cent of availability decreased from 60 per cent in 1948 to 25 per cent or 35 per cent less in 1953. All nine plants did not occur in the survey samples in 1948, 1950 and 1951, but did occur in 1952 and 1953. See Diagram I for per cent of the total food eaten and available, based on the nine plants previously mentioned.

Fifteen deer exclosures, containing 5 one-mill-acre check plots each, with a like number of control plots located adjacent to the exclosures, were checked by stem density, species and height class annually, on both the Red Dirt and Catahoula Game Management Areas.

Twenty permanent plots, 16 feet square, were also checked as to vegetation present and amount of browse recorded for each plant on both of the above mentioned areas.

No visible difference in vegetation can be noted between the exclosures and controls as yet. In both cases the stem growth on all species have increased in height and number.

Deer Studies—Catahoula Game Management Area

Browse Survey

Only two browse surveys have been run on the Catahoula Refuge. One survey composed of 200 sample plots was made on this area in 1951, and another survey consisting of 400 plots was made in 1953. Objectives of the browse surveys are as follows:

1. To determine the condition of winter deer browse.
2. Compare results with future deer browse surveys.
3. To determine carrying capacity.

Only 14 species of plants were found to have been browsed in 1951. One plant, rattan vine *(Berchemia scandens)*, which never fell within a sample plot, was noted to have been browsed heavily.

Here, as on the Red Dirt Refuge, greenbrier was browsed heavily. This is indicated, not only by the index of browsing, but by comparing the figure 21.0 which appears in the per cent food eaten column with the figure 5.0 which appears in the per cent browse available column. Greenbrier, hawthorn *(Crataegus spp.)* huckleberry *(Vaccinium elliotii)* and sweetleaf made up 82 per cent of the total food eaten in 1951.

The browse survey made in March, 1953, was based on 400 random sample plots. Fifty-one of these plots were run in the fenced area consisting of approximately 3,600 acres. This fence was not in existence at the time of the 1951 survey. Three plants, greenbrier, holly and rattan vine, showed a browse index in excess of 100 per cent. This is based on the 400 plots or total survey. Holly may be discarded from the standpoint of importance, as it only occurred once in the sample, and in all probability cattle were responsible for the browse noted. Greenbrier had a browse index of 164.8. The browse on this plant is out of balance with the availability as indicated by a figure of 40.4 per cent in the per cent food eaten column. Blackberry *(Rubus spp.)*, greenbrier, hawthorn, huckleberry and sweetleaf comprised approximately 89 per cent of the total food eaten, as determined by the 1953 browse survey. See Table VIII and IX for results of deer browse survey on the Catahoula Game Management Area for 1951 and 1953.

TABLE VII

PERCENTAGE OF FOOD EATEN AND AVAILABLE ON THE RED DIRT WILDLIFE REFUGE FOR THE PERIOD 1948 THROUGH 1953 AS DETERMINED BY BROWSE SURVEYS—(WINTER)

Species	1947-48*		1949-50†		1950-51		1951-52		1952-53	
	Per Cent of Food Eaten	Per Cent of Food Available	Per Cent of Food Eaten	Per Cent of Food Available	Per Cent of Food Eaten	Per Cent of Food Available	Per Cent of Food Eaten	Per Cent of Food Available	Per Cent of Food Eaten	Per Cent of Food Available
Greenbrier	5 9	13 7	55 5	16 3	30 6	9 6	20 0	7 5	9 47	5 18
Whitebay	28 3	18 5	15 8	14 4	19 7	11 2	10 8	4 7	6 56	2 61
Blackgum			1	1 9	3 5	7 2	3 8	5 5	47 09	7 58
Redbay	3 8	1 7	1 6	1 9	1 4	8	.2	2	76	33
Virginia Willow					7 9	3 2	10 4	2 2	4 06	1 78
Sweetleaf	17 6	15 3	3 1	2 8	6 1	2 4	10 9	2 9	5 34	3 34
Yaupon	18 9	9 5	9	2 8	5.7	3 2	2 9	1 5	5 07	2 49
Possumhaw viburnum	1 8	6.9	3 6	5 7	5 2	5 6	1 8	2 8	59	1 37
Spring Huckleberry			1 1	10 5	5 0	20 0	8	12 6	4 56	14 84
Red Maple			7	3 8	2 8	1 0	4 3	7 2	1 72	5 47
Wild Azalea	19 3	29 9	5 8	12 5	2 5	13 5	3 7	7 4	1 47	9 15
Flowering Dogwood			1 1	4 8	1 8	1 6	3 0	2 3	1 60	2 80
Sweetgum			.1	10 5	1 0	7 2	1 2	7 6	.38	8 89
Hawthorn			2	1 9	8	8	1 2	2 1	86	92
Water Oak			4	9	.7	8	1 5	1 2	99	93
Sumac					5	8			04	25
Poison Sumac							1 9	5	31	23
Blackberry			2 7	4 8	5	4 0	1 4	1 7	40	1 88
St. Andrews' Cross			4	1 9	.5	1 6	5	6	.44	70
French Mulberry			4 0	1 9	.2	1 6	2 9	1 5	2 70	1 49
Chokeberry			1 7	1 9	2	8	1	2	006	08
Gallberry							2 1	8	1 24	28
American Holly									03	1 00
Fringetree							9 1	1 6	2.37	58
Witch Hazel							.9	2 5	.34	4 22
Sassafras									.26	30
Yellow Jessamine							4	1 2	86	2 81
Wax Myrtle							7	16 4	.07	16 12
Alder							2 3	4 5	.39	2 34

*Survey by Dr. Fitch, U. S. Fish and Wildlife Service.
†Survey by Vincent H. Reid, U. S. Fish and Wildlife Service.

TABLE VIII

DEER BROWSE SURVEY RESULT ON THE NATIONAL CATAHOULA WILDLIFE REFUGE

MARCH, 1951

Browse Species	Per Cent of Plots Present	Average Density	Average Degree of Browsing	Utilization Factor	Per Cent of Food Eaten	Per Cent of Browse Available	Browse Index
Azalea	2	27	0	0	0	1.00	0
Alder	5	01	0	0	0	05	0
Blackberry	37.5	1.30	16	2	.2	6.00	.40
Blackgum	21.5	47	1.49	7	.7	2.28	3.72
Flowering Dogwood	11.5	37	4.39	1.6	1.6	1.79	10.98
French Mulberry	15.5	.52	2.90	1.6	1.6	3.00	7.26
Greenbrier	30.5	94	21.99	20.7	21.0	5.00	54.96
Hawthorn	33.0	4.68	2.61	12.2	12.2	23	6.50
Huckleberry	56.5	4.66	7.60	35.4	35.2	23	19.00
Red Maple	16.5	3.50	82	2.9	2.9	17	2.05
Poison Sumac	1.5	03	20.00	.6	.6	.10	50.00
St. Andrews' Cross	16.0	.17	1.75	.3	3	80	43.60
Sweetleaf	14.0	1.50	9.61	14.4	14.3	7.00	24.02
Sweetgum	44.5	1.60	6.26	9.0	8.9	8.00	15.65
Water Oak	1.0	.01	0	0	0	.05	0
Wax Myrtle	24.5	53	41	2	2	3.00	1.02
Yellow Jessamine	7.0	09	11.00	.9	9	40	27.50
TOTAL		20.65	100.7	...	...	...	...

TABLE IX

DEER BROWSE SURVEY OF CATAHOULA NATIONAL WILDLIFE REFUGE — MARCH, 1953 BASED ON 400 SAMPLE PLOTS BOTH INSIDE AND OUTSIDE OF THE FENCED AREA

Browse Species	Per Cent of Plots Present	Average Density	Average Degree of Browsing	Utilization Factor	Per Cent of Food Eaten	Per Cent of Browse Available	Browse Index
Azalea	1.5	7.75	5.20	40.30	10	50	13
Blackberry	15.5	25.25	24.30	613.50	2.90	1.70	62.40
Blackgum	9.7	35.25	9.90	348.90	1.60	2.40	24.70
Dogwood	4	13.25	4.50	59.60	20	90	11.20
French Mulberry	9	34.25	7.50	256.80	1.20	2.40	18.10
Greenbrier	38.2	137.75	61.40	8,457.8	40.40	9.60	164.80
Hawthorn	17.5	94.25	8.50	801.10	3.80	6.60	21.70
Huckleberry	44.2	674.50	12.70	8,566.10	40.90	47.20	22.70
Red Maple	6.5	30.25	10.10	305.50	1.40	2.10	25.30
Redbay	2	25	0	0	0	01	0
St. Andrews' Cross	9	9.00	39.20	352.80	1.60	60	85.7
Sweetleaf	10.7	127.75	10.20	1,303	6.20	8.90	25.6
Sweetgum	23	119.25	4.20	500.80	2.30	8.30	10.5
Water Oak	2.5	2.75	5.80	15.90	07	.10	14.5
Wax Myrtle	3.7	26.25	3.50	91.80	40	1.80	7.7
Witch Hazel	3	16.25	0	0	0	1.10	0
Yellow Jessamine	2.7	5.50	9.20	50.60	20	30	23.1
Fringetree	7	75	0	0	0	50	0
American Holly*	5	11.11	2.70	29.90	10	70	125
Rattan Vine	25	55.55	5.50	305.50	1.40	3.80	250
TOTAL		1,426.91		20,927.2			...

*Only occurred once in the sample. Cattle probably responsible for heaviest browse.

Deer Hunter Success

A series of studies was made at eight deer hunting clubs throughout Madison and Tensas parishes, during the month of December (open season on deer).

Three hundred pound capacity cotton scales, calipers, tape and metal tags were furnished to clubs and Game Rangers for the purpose of obtaining desired information on weight, sex, antlers, age and method of hunting. Forms were distributed to record this information, and deer jaw bones were collected with a numbered tag attached, for the purpose of aging the deer at a later date and completing the age column of the data forms.

Completed forms from all cooperating clubs and individuals are not in the hands of the writer at this

Measuring a buck's antlers and aging the dear by formation of his teeth in the lower jawbone are part of the deer study conducted by the Pittman-Robertson section.

time. Approximately 60 jaw bones have been collected thus far. The gross weight, as determined from available records, ranged from 96 pounds on a spike buck to 214 pounds on an eight-point buck.

The average weight for 30 deer was 146.4 pounds. Of 39 deer recorded thus far, 18 of the animals or 46 per cent were spikes. Of these spikes all but two were under 17 months of age.

Turkey Investigation

As the turkey work was limited to Red Dirt, Catahoula and Union Game Management Areas until July, 1953, this portion of the report will be divided into two segments.

Information pertaining to turkey on the above mentioned areas will be taken up in the first segment. Turkey information since July, 1953, will include the following Game Management Areas: Red Dirt, Catahoula, Union, Caldwell, Grant-Rapides and West Bay.

A concentrated effort to determine the turkey population was conducted on the Union, Catahoula and Red Dirt Refuges. A systematic check of the area was made in an attempt to locate flocks, by conducting a gobbling check, questioning natives, loggers and forest service personnel of the various areas, and by making periodic checks in search of turkey and/or turkey sign.

The gobbling check, as a method of locating flocks, proved valuable on the Union Refuge.

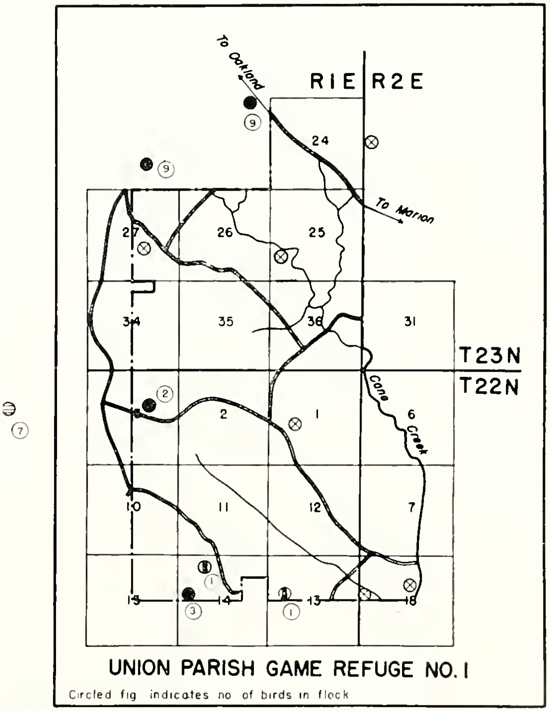
No gobbling was heard on the Catahoula Refuge, and only one flock of turkeys was located on Red Dirt by this system. The gobbling check on Catahoula was conducted by Collins and the refuge manager, Volmer Bowen.

Best results, in locating turkeys, were obtained through personal observation, noting repeated sign in a given area, and information gained from loggers and timber operators.

Four flocks of turkeys were located on the Catahoula Refuge. These flocks ranged in number from seven to 20 birds, with the total number of turkeys accounted for being 51 head (See Diagram II). It is believed that the one flock of 20 birds was probably the result of two flocks combining. Although no turkey nests were observed on the Catahoula Refuge, two groups of turkey poults were observed. One brood of ten poults was observed by Collins on May 28, 1953. These birds were ranging in the central portion of the fenced area on Catahoula. Another brood of young turkeys was sighted by Collins on June 10, 1953. This brood of undetermined number was observed following a turkey hen in the southeast section of the Catahoula Game Preserve.

Five definite flocks of turkeys, ranging in number from two to nine birds per flock, were located on the Union Refuge. The gobbling check was instrumental in locating several turkeys. Gobbling was heard in six widely spread localities, but the turkeys were not sighted. A total of 30 birds were definitely accounted for, and an esti-

DIAGRAM No. II



⊖● Indicates definite location of turkey flocks (March 1953)
◑ Observed only on one occasion. (Possibly broke away from flock)
⊖ Blue leg bands present (1952 release)
⊗ Gobbling heard, turkey not sighted
Total estimated population .... 50 turkey

mated 50 head of turkeys are ranging in and around the area at the present time (See Diagram III). Only seven turkeys, out of the total number sighted, were observed with blue leg bands. This denotes turkey release of the year, as blue celluloid bands were fastened to all turkeys received in 1952. Numerous turkey tracks were seen, on every visit to Union Refuge. See Table X for observation data.

Four definite flocks, one flock composed of three hens and one gobbler adorned with blue leg bands, ranging in number from three to four birds per flock, were located on the Red Dirt Refuge. The total number of birds located comprised only 14 head. Nine of the 14 turkeys located were hens and five were gobblers. See Diagram IV. Only one flock, one gobbler and two hens, appeared to be wild. The other turkeys could be approached rather closely before taking alarm, and then they would run off only a short distance and stop. Two flocks, composed of two gobblers and one hen, and three hens and one gobbler respectively, had taken up at Bryant Bowden's and Abrum Vershers' houses. One turkey hen has been seen quite frequently on or near the main road approximately one mile from the west border of the refuge. Consult Table XI for sight records.

As previously stated, no nests were observed on Catahoula, but two broods of poults were seen. Two nests were known to have occurred on Union, with 13 and 16 eggs respectively. Turkey hens with blue bands on their legs were brooding these eggs. Both the turkey hen and 13 eggs were destroyed by some predator. The other nest, containing 16 eggs, made a successful hatch. One gobbler with blue leg band, inhabiting this same area was also destroyed by a predator.

TABLE X

TURKEY OBSERVATION ON UNION REFUGE

Date	No. Seen	Sex		Age		Blue Band	Native	Re-leased
		Male	Female	Mature	Im-mature			
2/12/53	1	×		×				×
2/28/53	2	×		×				×
3/ 3/53	1	×		×		×		×
3/11/53	2	1	1	×				×
3/11/53	7	3	4	×		×		×
3/14/53	9	4	5	×				×
3/20/53	3	×		×		×		×
4/ 7/53	1	×		×				*
4/ 9/53	1	×		×				×
5/ 2/53	1	×		×				×
5/ 4/53	*				×			
5/10/53	1		×	×				×
5/10/53	1	×		×				×
5/20/53	*				×			

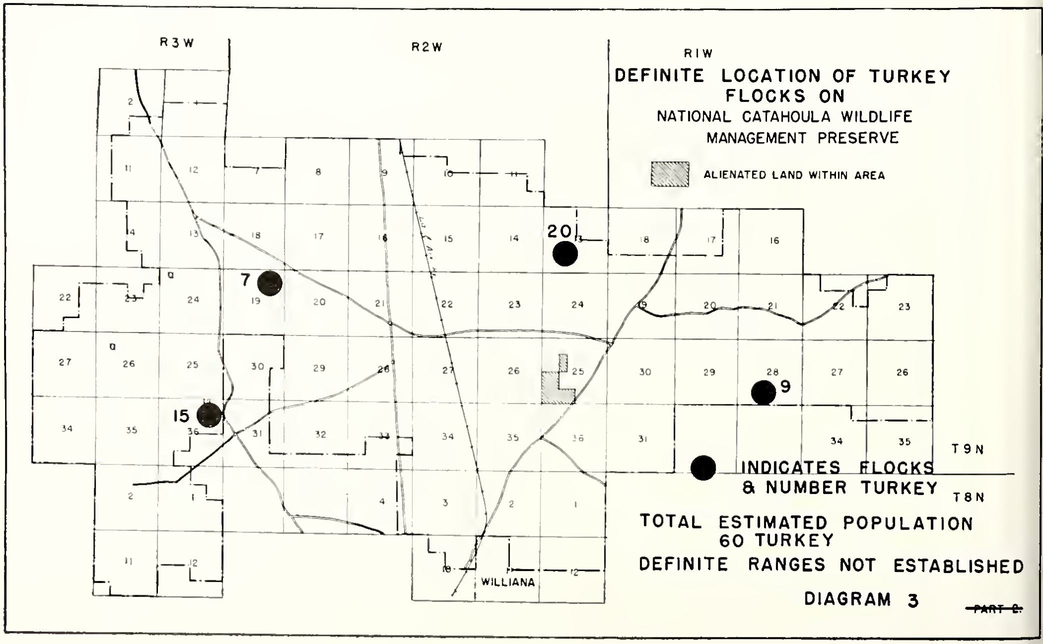
*Undetermined.

TABLE XI

TURKEY OBSERVATIONS ON RED DIRT

Date	No. Seen	Sex	Age	Location
4/9/53	1	Female	Mature	Cypress Road
	1	Female	Mature	H. C. Beasley Pasture
	1	Female	Mature	Main Road Approximately 1 mi. East of West Boundary
4/24/53	1	Female	Mature	Near Iron Bridge (Kisatchie)
5/ 5/53	1	Male	Mature	Near Iron Bridge
5/ 8/53	1	Male	Mature	Near Beasley Home
5/11/53	1	Male	Mature	Near H. C. Beasley Home
5/28/53	1	Female	Mature	Near Iron Bridge
7/ 6/53	1	Female	Mature	Food Plot Near Turkey Pen
7/ 8/53	1	Female	Mature	Food Plot Near Turkey Pen

One gobbler and one hen are ranging between H. C. Beasley's house and the iron bridge across Kisatchie Creek. Although a total of 10 turkeys were observed as illustrated in the above table, some of them were the same birds and only 4 different turkeys may be accounted for.


R3W
R2W
R1W
T9N
T8N
WILLIANA
20
7
15
9
▨ ALIENATED LAND WITHIN AREA
● INDICATES FLOCKS & NUMBER TURKEY

DEFINITE LOCATION OF TURKEY FLOCKS ON
NATIONAL CATAHOULA WILDLIFE
MANAGEMENT PRESERVE

TOTAL ESTIMATED POPULATION
60 TURKEY
DEFINITE RANGES NOT ESTABLISHED

DIAGRAM 3 ~~PART 2~~

Only two nests were definitely known to have occurred near the Red Dirt Refuge One nest containing 11 eggs was located on the Cypress road approximately one mile north of the refuge boundary, and the other containing seven eggs was located approximately two miles west of the west boundary near James Dodds'. Both nests were destroyed. It is not known what happened to the turkey hen setting the 11 eggs, but it is believed that someone picked her up, as the hen and eggs all disappeared overnight with no trace of what may have happened. See Table XII for nesting data.

No special attempt was made to locate nests on any of the refuges. Table XII is made up of only definitely known nests. No assumptions or non-valid reports were made or recorded. Based on the known nesting success the percentage is very low. No doubt the excessive rains in April and May of 1953 played havoc with nests and young turkey.

The overall survival of the turkey released on these three areas has been relatively low, with an average of 16.72 per cent survival rate on the three refuges. This includes survival and reproduction, with the exception of reproduction in 1953. It must be kept in mind that the per cent survival figure is based on the known number of turkeys inhabiting the refuges, at the present time, and the known number of turkeys released on these areas from 1950 through 1953. See Tables XIII and XIV for details of release and survival.

TABLE XII

KNOWN NESTING DATA ON THE CATAHOULA, UNION AND RED DIRT REFUGES — 1953

Date	Location	No. Nests Observed	No. Eggs Per Clutch	No. Eggs Hatched	No. Poults Seen	Remarks
4/25/53	Red Dirt	1	7	None	None	Destroyed by predator
4/19/53	Red Dirt	1	11	None	None	Destroyed
5/ 4/53	Union	1	13	None	*	Nest broken up, Turkey hen killed
5/15/53	Union	1	16	16	None	Hen wearing blue band
5/20/53	Union				*	May be same ones sighted 5/4/53
5/28/53	Catahoula	None			10	None
6/10/53	Catahoula	None			*	None

*Undetermined number.

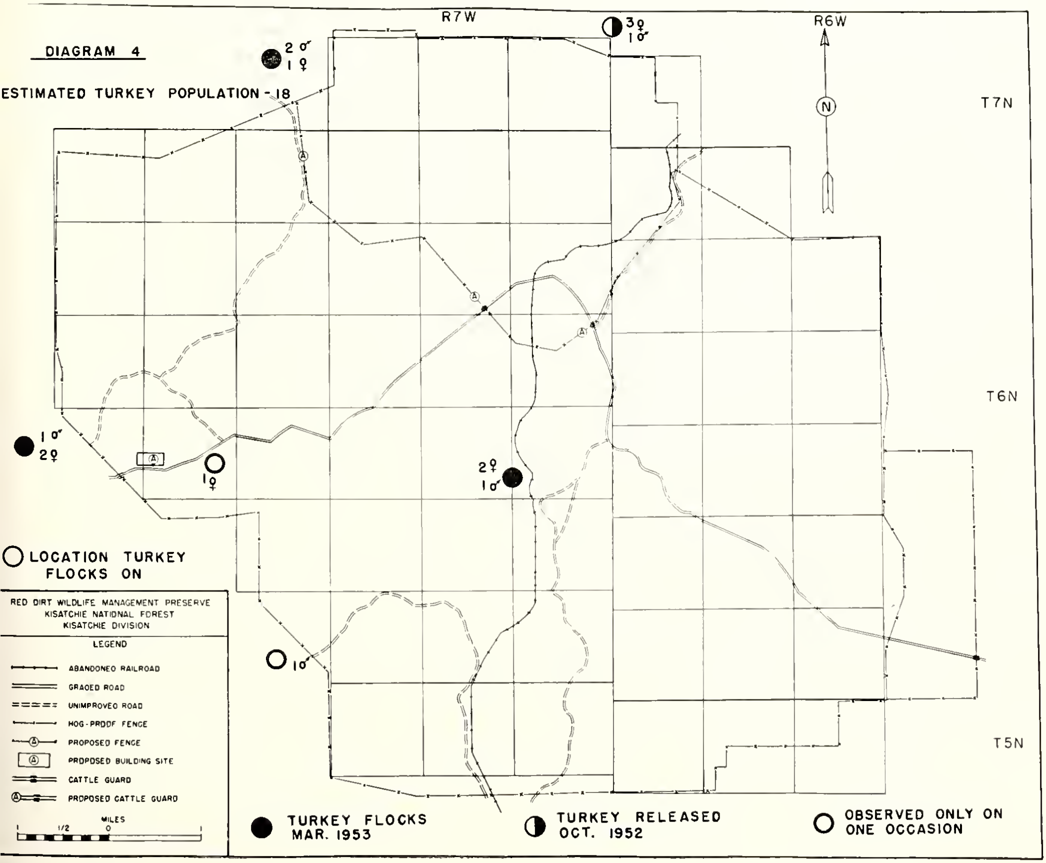


TABLE XIII

TURKEY RELEASE BY YEARS ON THE CATAHOULA, UNION AND RED DIRT REFUGES

Year	Location	No. Turkey Released
1949-50	Catahoula	28
	Red Dirt	53
	Union	49
1950-51	Catahoula	46
	Red Dirt	48
	Union	43
1951-52	Catahoula	51
	Red Dirt	53
	Union	52
1952-53	Catahoula	49
	Red Dirt	49
	Union	47

TABLE XIV

PER CENT SURVIVAL OF TURKEYS AS DETERMINED BY RELEASE FIGURES AND KNOWN NUMBER OF BIRDS AT THE PRESENT TIME RELEASED FROM 1949 THRU 1953

Location	No. Turkey Received	No. Turkey Released	No. Turkey Present 1953	Per Cent Survival
Catahoula	178	174	51	29 31
Red Dirt	232	203	14	6 90
Union	220	191	30	15 70
Total		568	95	16 72

Turkey—Second Segment

Grant-Rapides

Observations made on the Grant-Rapides Game Management Area indicate a very small population. Only 50 turkeys were released on this area in 1951.

Turkeys were observed here in July, August, September and October of 1953. However, the greatest number of birds seen, at any one time, were three. On July 14, 1953, two gobblers were sighted, and on September 9, 1953, one gobbler and two hens were observed. Although a total of nine birds (not over three at any one time) was sighted over a four month period, it is believed that only four to six turkeys are present in the area.

Catahoula

Sight records on this area indicate that turkeys were fairly successful with the spring hatch. Several flocks of poults have been observed, by various people, in and around the game management area.

Mr. Bowen, the refuge manager, estimates the total population of Catahoula between 150 and 200 turkeys. The technicians, associated with turkey work on this area, can account for approximately 65 head.

Turkey tracks and fresh signs were seen almost daily on the food plots at Catahoula, during the quarter ending in September, 1953.

Red Dirt

Although 203 turkeys have been released on the Red Dirt National Wildlife Refuge, the population there at the present time is extremely low. The last turkey sighted on the area, by the project leader, was on July 8, 1953. A turkey hen was observed feeding on millet in one of the food plots on that date.

As this area is cut up by sandy roads, occasional sign would be seen if any number of turkeys were present.

Four turkeys were observed, off the area, in December, 1953, and tracks of one bird were seen around the food plots as late as December 25, 1953. The four turkeys ranging off the area have taken up at Bryant Dowden's and Abrum Versher's houses. These turkeys may be considered lost as potential restocking is concerned. Mr. Beasley, the refuge manager, and the writer estimates a total population on and around the area at approximately nine turkeys. No reproduction, to our knowledge, occurred in 1953.

Union

Some turkeys and frequent turkey signs have been observed on each visit to the Union Game Management Area.

Three gobblers and four hens were observed on this area from July 8 to August 19, 1953, by C. L. Hollis, the refuge manager. On September 2, 1953, several head of turkeys were observed, by the project leader, feeding in a mule lot (logging pen).

A total number of 32 turkeys was seen at different intervals, by Mr. Hollis, from September 14 to December 22, 1953. There is an estimated number of 25 turkeys ranging on and around the refuge at the present writing.

Caldwell

The records are incomplete for this area, but a rough estimate of the turkey population would be approximately 50 birds. Twenty-three turkeys were observed here on July 13, 1953. One group of eight poults were seen by Mr. Lively, the refuge manager, on July 11, 1953, and four gobblers were observed, by the project leader, at a watering hole on September 10, 1953.

West Bay

It is not known how many turkeys were released on this area, but the figure would be somewhere over 350 head.

According to a survey made by Jack Collins, assistant project leader, there is at least 150 turkeys ranging on and around this game management area.

A thorough investigation has not been completed at this time.

Mr. Collins observed one turkey hen and seven poults on the 14th day of October, 1953. This was undoubtedly the results of a second nesting.

Mr. Bass, the refuge manager, reports having seen 93 turkeys at different intervals from July 2 to December 24, 1953.

An Oak Production Study Underway[1]

Oak mast has long been recognized as a salient wildlife food. Rich in oil and starch, it is a source of food concentrate for wildlife. Mammals as large as deer and as small as mice vie for the acorn crop. Several species of birds, notably, turkey, quail and waterfowl among the southern game birds, relish oak mast.

In 1951, the laboratory of the state experiment station, Louisiana State University, Baton Rouge, made a chemical analysis of a sample of acorns collected from the Kisatchie National Forest in west-central Louisiana. Table I shows the results of this work. The analysis indicates that the nuts are relatively low in protein, the body building compound, but high in carbohydrates, the energy and fuel compound.

TABLE I

APPROXIMATE CHEMICAL ANALYSES OF ACORNS COLLECTED ON THE KISATCHIE NATIONAL FOREST, LOUISIANA

			Carbohydrates			
	Protein	Fat	NFE	Fiber	Water	Ash
			Per Cent			
Sandjack	5.9	13.8	49.5	14.9	13.7	2.2
Blackjack	5.1	5.6	50.4	22.8	13.7	2.4
Post Oak	4.7	4.2	60.0	14.3	14.3	2.5
White Oak	3.9	2.9	57.1	14.1	19.5	2.5
Southern Red Oak	3.6	5.6	48.3	26.6	13.1	2.8
Cow Oak	3.1	1.8	58.9	12.9	21.3	2.0
Willow Oak	3.3	8.1	49.2	21.4	16.2	1.8

Oaks are found growing in the four general tree regions of Louisiana. Whether they grow in the shortleaf-oak-hickory, the longleaf pine, the bottomland hardwood or the upland hardwood forest region, the nut crop is used by wildlife.

Because of the importance of oak mast as a game food and the attention that is being given oaks in timber management on pine lands, the Pittman-Robertson Section, Louisiana Wild Life and Fisheries Commission, and the Branch of Research, U. S. Fish and Wildlife Service, have begun a cooperative study of oak mast yields. The work is being done on the longleaf pine lands of the Kisatchie National Forest in west-central Louisiana. The objectives of the investigation are: (1) to determine mast yields and any cyclic production characteristics that the oaks may have, and (2) to correlate mast production with tree crown size, bole diameters, age, tree stand densities and timber management practices.

Quarter milacre seed or acorn traps have been used to sample the acorn fall. One or two traps are used per tree depending upon the crown size and crown position. The traps are tended weekly from the first of September to January or February when the trees are clear of nuts. The acorns are tallied and dry stored on each trap visit. From the sample catch of the seed traps at the end of the season, total production for the tree is calculated. The air dried acorns are weighed to determine the pounds of mast produced.

In the piny woods, scrub oaks, such as sandjact, blackjack and post oaks are found growing on the hills in the under story of second growth pine. Where fire has been excluded for a period of years, these scrub oaks are found in solid and mixed stands. In the numerous small stream and stream branches that drain the piny woods, oaks, such as, water, willow, southern red, white and cow or swamp chestnut oak are found. These small stream bottoms, that constitute roughly twenty-five per cent of the pine area, are of paramount importance to wildlife. Their presence furnishes wildlife with a diversification of habitat, brushy cover, and a variety of tree and shrub foods. The hill and stream bottom oaks listed above are those being observed in the mast production study.

The investigation was begun in 1950, and it is planned to continue the yield measurements until a reliable picture of high and low mast yields is obtained.

Traps have been placed under 106 trees. From the trap catches, the first few acorns fall around the first week of September and reach a peak in fall the last half of October. Following this there is a gradual tapering off, and by the last half of January most of the trees are usually free of nuts.

Not all acorns that reach the traps or ground are sound. Many are faulty because of acorn weevils or fungus growth. Cutting tests were run on a series of acorns in 1951 to determine their soundness. For the scrub oak sample, sandjacks were 48 per cent, blackjacks 34 per cent and post oaks 81 per cent sound. For the stream bottom oaks, water willow and southern red oak were about 45 per cent sound, while white oak and water oak were approximately 90 per cent good.

Acorns for the various species differ in size and weight. From sample counts of well developed, air dried, and apparently sound acorns collected on the Kisatchie National Forest, the approximate number of acorns per pound has been determined. For the scrub oaks, the counts showed about 350 sandjacks, 280 blackjacks or 230 post oaks in a pound. For the stream bottom oaks, about 450 water oaks, 120 white oaks or 60 cow oaks weigh a pound. Although production figures may be high for some species with small acorns, the pounds of mast produced may be actually no greater than for the tree that produces fewer, but larger nuts. Thus a white oak yielding 2,000 apparently sound well developed nuts and a cow oak producing but 1,000 acorns would both produce about 16 pounds of mast.

For the three seasons, 1950, 1951 and 1952, that mast measurements have been made, 1951 was the best year. Individual production figures given below are for that year. Of the three species of scrub oak, sandjack has proved the best producer followed by blackjack and post oak. The best sandjack produced about 5,500, the best blackjack about 3,100 and the best post oak about 1,500 nuts. With respect to bole measurements, sandjacks with diameters over six inches, blackjacks over eight inches and post oaks over five inches gave the best yields.

Of the five observed species of oaks that grow in and fringe the piny woods stream bottoms, water oak has shown best yields. It is followed by willow, white, southern red and cow oak. The acorn yields for individual trees were as follows: water oak, 10,000; willow oak, 7,000; white oak, 3,300; southern red, 3,000; and cow oak, 1,000. Water and willow oaks with bole measurements over 9 inches in diameter gave best production. Southern red oaks over 12 inches and white and cow oaks over 15 inches in diameter gave best yields.

Generally, the oaks under observation in the stream bottoms, have outproduced the scrub oaks of the hills.

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[1] This report is the result of the cooperative efforts of V. H. Reid, U. S. Fish and Wildlife Service, and Raymond Moody and Jack O. Collins, project 24-R La. Wildlife & Fisheries Comm.

In both cases, however, the larger boled trees with good crowns have produced most acorns.

As indicated by the trap catches, the acorn production varies from year to year and with individual trees. Weather may adversely influence yields. A damaging frost when the oaks are flowering in the spring will ruin a nut crop just as it will a fruit tree or berry crop. Safely past the flowering stage, the acorn crop can still seemingly be hurt by drought conditions. Apparently severe dry weather during the growing season will curtail the development and setting of mature acorns. Of the oaks under observation, post, white and cow oak belong to the white oak group whose acorns mature in one year. Blackjack, southern red, water, willow and sandjack belong to the black or red and willow oak group. These oaks require two years to mature their acorns. Thus, with a severe frost during the flowering season, the acorn crop for the white oak group would be damaged, but for the black or red oak group the crop for the following year would be hurt. Undoubtedly several other less conspicuous but relatively important factors are involved in the ultimate maturing of a good acorn crop.

As this investigation continues, a more complete picture of mast production for the hill oaks and the stream bottom oaks in the pine lands is being pieced together. It is the aim of the study to determine what can be expected in the way of mast yields from these pineland oaks and what species best serve wildlife by the production of this valuable food. The study was initiated to provide sound working information for the game manager and forester in evaluating and handling these species in timber management.

Project 25-R-1

Summary Progress Report
July, 1952 - December, 1953

Introduction

This report covers progress on Rabbit Investigation Project 25-R-1 for the period of July, 1952 to December, 1953. The objectives of the project have been to determine population trends, food habits, and life history of the cottontail and swamp rabbits in the state. This project is under the joint supervision of Dr. Bryant A. Bateman and Prof. Leslie Glasgow of the Louisiana State University forestry school, and Dr. Lyle S. St. Amant, Supervisor of Federal Aid Research. Two students of the game management department of the Louisiana State University forestry school, have been conducting the research on this project. This is a new type fellowship project, in cooperation with the game management department of the Louisiana State University forestry school.

The jobs that have been completed are:

1. A preliminary research of the areas under investigation.
   (a) Each study area, one in East Feliciana Parish and one in Ascension Parish, has been surveyed and the boundaries have been determined.

2. Preparation of a type map of each study area and buffer zone.
   (a) Detailed type maps of both study areas have been completed, showing the forest type, understory types, and other necessary information.

The jobs that have been carried over, and on which work is still being conducted are:

1. Census methods in which tentative populations have been determined.
   (a) The methods used have been trapping and retrapping, night counts with headlights and mowing operations.
2. Food habit studies.
   (a) A complete tabulation of plants has been made and some semi-controlled feeding experiments have been carried out.
3. Life history studies.
   (a) Specimens have been collected for laboratory diagnosis. Data has been gathered pertinent to sex ratios, breeding conditions, relative weights, parasites, mortality, etc.

Individual progress on the different jobs may be found discussed in the quarterly reports submitted during the previous months, July, 1952—December, 1953. A brief summary of the type of work involved and information collected is as follows:

Rabbit Investigation Project—Work Plan No. 1

Job No. 1—Preliminary Survey of Areas

For the study, two areas were selected: one in the rolling pine section of the state and one in the river bottom site. These areas were chosen on the Dr. Robert Jones' farm at Clinton, La. and on Dr. Jack Jones' farm near Geismar, La. These areas lie in East Feliciana and Ascension Parishes and will henceforth be designated as Area No. 2 and Area No. 1, respectively.

Area No. 2 is located in a rolling pine section grading into creek bottom and is rather extensively devoted to mixed farming. Corn and cotton are the main crops in the area, along with a few patches of peanuts and sweet potatoes. On the uncultivated areas, cattle are grazed. The opposing area located about sixty miles south is not under crop cultivation, however, hay is cut and baled extensively. The land is used for grazing purposes and thus, cattle production.

According to the objectives outlined in Job No. 1, work was begun on both areas to determine the location, size, and suitability of the areas to be studied. In order to select a study area at each location, a strip cruise was made in order to obtain an index to the rabbit population. Four general areas were cruised with notes being taken of rabbit pellets and rabbit tracks. A total of 1,251 acres was cruised in this preliminary survey.

On area No. 1, the same type of cruise was carried out with a total coverage of about 800 acres. In addition to the day-time census work in surveying the areas some night cruising with headlights was done to verify the rabbit population.

Job No. 2—Census Methods

The objective of this job is to determine the rabbit population and future population trends in both of the study areas. A cruise was made on each area during a period of successive nights. The idea was to locate as many rabbits as could be seen with headlights. This method proved to be rather successful in obtaining a opulation sample. The cruises were made along the dges of hardwood flats, creek bottoms, and out into he edges of pastures. Most of the rabbits in Area No. 2 vere found along the edges of creek bottoms near a unning supply of water.

On Area No. 1, the number of rabbits seen was in reater proportion per unit of ground area than on rea No. 2. The flood plain type of country evidently arries a higher rabbit population. This type of cruising is suitable as a check on rabbit populations and equires but little practice to make tabulations.

During the period July, 1952-December, 1953, an ttempt has been made through the use of different nethods of cruising, to determine the rabbit populations n both study areas. The methods employed have been:

1. Headlighting at night with strip cruising.
2. Headlighting at night with contour cruising.
3. Mowing pasture.

A discussion of the various methods used and the robable populations of the areas during the periods hown is as follows:

An intensive trapping of Area No. 1 was carried ut during the winter of 1952. As the rabbits are trapped, hey are tagged, sexed and released. Because the traps annot be run every morning and the rabbits are not sed to the bait being used, the traps are locked open nd baited for a period of ten days to two weeks and hen set overnight. Cabbage, lettuce and sweet potatoes ave been tried and cabbage has proven to be the best ait tried thus far. Collapsible wire cage traps are used t the present time to trap the rabbits.

There has been some injury to several of the rabbits aught. This was caused by the animal trying to escape. n one case, a rabbit was killed by a predator.

Trapping rabbits at night with woodcock nets and eadlights has been tried on Area No. 1. Although very ttle trapping has been done by this method, several abbits have been caught. The advantage of this trapping method is that it can be used year round whereas ve traps can be used during winter months only. The est results are during and just after rains, and during he phase of the new moon. Special nets with deep ockets are used so the rabbits will have less chance to scape.

eadlighting at Night

1. *Strip Cruising:* On study Area No. 1 strip cruising at night with headlights has been attempted at arious intervals. Live trapping and tagging the rabbits n this study area during the winter months supplemented some of the cruising work. Twenty-one rabbits vere trapped and tagged during the winter months. The total trapping area was 178 acres. Applying this figure to the total acreage within the boundaries of the study area it is indicated that the density per acre is .16 rabbit or a total population of 90 rabbits. The figure arrived at is believed to be the bare minimum for a couple of reasons:

—*Photo by St. Amant*

ottontail in collapsible type wire trap. This rabbit will be tagged, sexed, weighed, examined and released.

Photo by St. Amant

He'll wear a tag in the ear when this job is over.

(a) The rabbits on the area took quite a while to become accustomed to the traps and to taking the bait offered. As a result no rabbits were trapped over considerable acreage. The acreage involved was figured in on the operation because the traps were actually there and had to be moved regularly. If the acreage in question was subtracted from the total no doubt a higher population figure would result.

(b) The vegetation at the beginning of the trap period and toward the end of the period was fairly abundant, succulent, and green; it was difficult to capture any specimens during this period. The above reasoning undoubtedly accounts for the low winter population figure at least as far as the trapping operation is considered. The total results of the night cruising made at Geismar for the months indicated is shown in Table No. 1. The autumn population appears to have declined as the winter months (1952) approached. During the colder weather as insects and fruit get scarce, foxes and opossums may rely on young and immature rabbits as a source of animal food. Several reports have been heard (personal conversation), of foxes on the area but none has been seen thus far. There are numerous opossums on the area. The low population figure for August is presumably due to movement of the rabbits to brush pits. This was during late August and early September, which was rather dry. It has been known that the populations move during periods of drought. It must be remembered that the rabbit population is not evenly distributed over the place, but rather in irregular groups. One may run into several rabbits on one cut, and not see any for several cuts thereafter. The figures presented are averages.

2. *Contour Cruising:* The results of the headlight cruises at Clinton are shown in Table No. 2. The contour cruise in the area is somewhat different than the strip cruise at Geismar. A position is taken about 1½ chains from the edge of the woods and a contour strip is made along the perimeter searching for feeding rabbits. It

has been noticed that the bunnies feed in open pasture about two chains in width from the edge of the woods. The sighting distance at night with headlights is good for about 2-2½ chains. At greater distances, rabbit eyes can be picked up but this is usually accidental. The information presented here is figured by computing the acreage within the contour strip and applying this to the number of rabbits seen on the cruise. The information collected in this manner cannot be applied to the total acreage on the study area to arrive at a total population figure. The reasons are obvious:

(a) Practically all the rabbits feed in the area along the perimeter of the woodlands at night where close cover is available and none has been found in the middle of the pasture. Therefore, as a result of the border feeding one is seeing a high percentage of the total population, possibly over 90% sample. The cruises made on both areas have been made under similar weather conditions, usually on clear calm nights during the dark of the moon, when rabbits are most likely not to be disturbed or under the influence of adverse weather conditions.

3. *Mowing Pasture:* During the months of June and July (1953) a tractor was secured for the purpose of mowing pastureland at Geismar. The mowing operations flush all rabbits that might be hiding in the pasture woods and along the ditches. Adult specimens are virtually impossible to catch, but several young cottontails were collected. Those young rabbits are kept and fed for life history and food habit studies. The results of the mowing operations showing tentative population estimates is shown in Table No. 3. On an average it has been determined that out of every four cuts mowed three rabbits will be flushed. This gives .75 rabbit per cut average or one rabbit every 4.4 acres. The cuts on the place average 3.3 acres. Using this basis it is estimated that during the summer months there are about 175 plus-or-minus rabbits on the study area of 763 acres. This is a density of .22 rabbit per acre or one rabbit every 4.3 acres. In operations 1-5 just the pasture was cut, the cover in the ditches was left untouched. On operations 6 and 7, the pasture was left uncut and the ditches were mowed. According to the number of rabbits jumped, a density of .40 rabbit per ditch acre is shown. This indicates that the rabbits undoubtedly use the ditches as the main retreat cover and do not rely in hiding in pasture weeds during the day time.

TABLE NO. I

GEISMAR-STUDY AREA NO. 1—ASCENSION PARISH

Acres Covered on Cruise	No. Rabbits Seen	Total Acres	Total Rabbits	Rabbits Per Acre	Acres Per Rabbit	
89.6	24	763	205	.26	3.7	Oct.
72.6	18	"	189	.24	4.0	Nov.
135.3	30	"	169	.22	4.5	Dec.
52.8	12	"	173	.22	4.4	Jan.
19.2	5	"	199	.26	3.8	May
31.3	10	"	243	.31	3.1	June
25.0	3	"	92	.12	8.3	Aug.
15.0	2	"	117	.13	7.5	Aug.
20.0	3	"	114	.15	6.6	Sept.
17.0	3	"	134	.17	5.6	Sept.
33.0	11	"	250	.34	3.0	Oct. & Nov.

TABLE NO. II

CLINTON-STUDY AREA NO. 2—EAST FELICIANA PARISH

Acres Cruised	No. Rabbits Seen	Density Per Chain	Chains Per Rabbit	
11.2	3	.05	20	Aug.
38.4	11	.05	20	Aug.
40.6	12	.06	18	May
12.0	3	.05	20	May
16.0	5	.12	9	Aug.

Food Habit Studies

The objectives, as outlined in the work plan, call for the determination of the foods eaten by the rabbits and the preference for different cover types. A complete collection of plants, both herbaceous and woody, was made in Area No. 1. This area was chosen first as the number of plants was less varied than in the upland section and a more complete identification could be made. An accurate identification of plant material is essential as this is the essence of food habit studies.

The percentage of forbs and grasses is slightly higher on Area No. 1 (Geismar tract). This is due to a higher proportion of open fields compared to the wooded area. The wooded area is concentrated along a series of drainage ditches and due to the extensive grazing throughout the place is confined to the ditches. The ditches contain non-merchantable brush along with numerous vine and briar patch entanglements. The edges of the ditches are probably grazed also but not to the extent that the main pasture is grazed.

On Area No. 2 (Clinton tract), the terrain is spotted with woods and cultivated fields. There is also a large area devoted to pasture. The woodlands in this section of the country are rather extensive and in some instances cover a width of forty or more chains. The variety of wood species is greater here than on the opposing tract. Both areas are rather heavily grazed by small groups of cattle. Area No. 1 is grazed to a greater extent due to a higher proportion of pasture available.

Food Habits Research

During the past months, July and August (1953), several cottontails of varying ages have been held in captivity in an attempt to acquire certain information on their habits and development. The ages on the bunnies range from two, three and four weeks on up to four and a half months. One rabbit caught during March of this year and mentioned in the preceding reports has developed until it is almost full grown.

Mortality has been rather heavy on these young rabbits while they are held captive. The co-leaders reason that the major factors accelerating death are:

1. Handling of young during transfer of pens; the young rabbit in general is easily frightened when handled but gradually becomes accustomed to human presence.
2. The weather being excessively hot.
3. Lack of some nutritive value obtained in certain plants available during freedom of movement.

This study was conducted on the pastureland at Geismar-Study Area No. 1—Ascension Parish.

The rabbits were placed in a wooden pen frame 6 x 8 x 1.5 (feet), to which ½ inch hardware mesh had been nailed. The top of the pen was covered with copper screening. The bottom was left out of the pen so the young rabbits could have the feel of the ground and also eat the available food therein. To obtain a variety of plants, the pen was moved at frequent intervals.

As soon as the pen was moved, the rabbits were watched closely to see which grasses and forbs would be taken first. The type of vegetation eaten was noted as preferred vegetation, vegetation which will be eaten readily, vegetation which will be accepted only when others are not available, and vegetation which was refused entirely.

In an attempt to determine whether rabbits would eat certain plants which are normally refused or are not very palatable the pen was left in a specific location for several days. After all the preferred foods were eaten the bunnies resorted to foods that were not normally accepted.

The pasture area at Geismar is predominantly grasses. The following grasses make up the major portion of the ground cover:

Common Name	Scientific Name
1. Bermuda	*Cynodon dactylon*
2. Carpet	*Axonopus* sp.
3. Smut	*Sporobolus Poirettii*
4. Foxtail	*Setaria glauca*
5. Baya	*Paspalum notatum*
6. Dallis	*Paspalum dilatatum*

White Dutch Clover *(Trifolium repens)* is also dominant on the area but occurs in erratic isolated patches or groups. Bermuda and Carpet grass are by far the most abundant and practically form a mat with the other species listed interspersed in varying amounts. This occurs with the exception of Smut grass which is found in matted clumps here and there over the pasture. Bermuda and Carpet grass alone comprise at least 90% of the ground cover. The pasture on the study area is interlaced by a series of shallow drainage ditches. The pattern of these ditches grids the study area so that the pasture land is a series of uniform rectangular blocks.

Along these ditches is a variety of woody and herbaceous vegetation. The lesser vegetation is composed mostly of species of rushes, (*Juncua* spp.), sedges, (*Carex* spp.), and briar, (*Rubus* sp.). Some of the predominant pasture weeds are cocklebur, (*Xanthium*), yankeeweed, and arrowweed which grow profusely in spots. The pasture grasses grow into the ditches but thin out considerably.

The trees and shrubs are predominantly Swamp Dogwood, *(Cornus asperfolia)*, and haws, *(Crategus)*.

During the daylight period the rabbits stay in the ditches which offer ample retreat cover and move out into the pastures at twilight to feed. Some feeding is also done in the ditches during the daytime as has been indicated by examination of the plants found there. Nests and overnight forms are also made in the thick cover. A summary of the plants eaten by the captive rabbits is listed in Table No. 4.

Succulent leaves of blackberry were offered and were still refused. It may be that the stiff hairs or barbs on the blackberry leaves are reason for refusal. Plants 20-24 were entirely refused even after repeated observations. This table indicated fairly well the food habit conditions on the study area at least for captive rabbits. Not all the representative plants have been covered as yet in this experiment.

In the manner in which this experiment has been carried out a closer approach to normal conditions would be hard to realize unless it would be observations directly in the field with the use of binoculars. The fallacy in the use of binoculars lies in the locating of the correct plants upon which the rabbits have been feeding. This would be virtually impossible at Geismar where there is heavy grazing.

TABLE NO. III

MOWING OPERATIONS

PASTURE

GEISMAR-STUDY AREA NO. 1—ASCENSION PARISH

Date	No. Acres Mowed	No. Rabbits Flushed Young	No. Rabbits Flushed Adult	Total Rabbits As Applied to Total Acreage
6-3-53	19.8		4	152
6-5-53	16.5	2	1	139
6-15-53	17.0	3	1	180
6-25-53	23.1	3	3	198
6-29-53 & 6-30-53	42.9	1	8	160
				Sum 829 ÷ 5 = 166 average

* .75 rabbit per cut average — 3.3 acres.

* .21 rabbit per acre or 1 rabbit every 4.5 acres average.

MOWING OPERATIONS

DITCHES

Date	No. Ditches	Acreage	No. Rabbits Flushed	Density Rabbits Per Acre	Density Acres Per Rabbit
7-1-53	18	3.6	9	2.5	.40
7-2-53	13	2.6	7	2.6	.37

Some observation attempts have been made with binoculars during the full moon phase at night but this has not proven too successful.

Food habit experiments have been carried out on the Clinton study during September in practically the same manner as on the Geismar study area during June of this year. Some experimental work was also carried out on an area closer to Baton Rouge on the terrace soil type.

The rabbits in these experiments were caged and allowed to nibble the vegetation protruding into the cage. The wooden pen used at Geismar was too cumbersome to move to the Clinton area and was abandoned. These included most of the typical vegetation found at Clinton.

One female rabbit was put in a large fenced pen 35 feet by 20 feet and was therefore free to roam and eat the available plants. After a few days, a tally was conducted on the plants eaten within the pen. Commercial rabbit food in pellet form and plenty of water were available to the rabbit so it was not forced to eat the vegetation. Some vegetation was ignored and other vegetation was eaten out.

This particular phase of the experiment with the single rabbit was carried out near Baton Rouge.

The pasture at Clinton is composed mostly of Bermuda grass, goosegrass and other species interwoven into a mat. Some areas are very thick and others are rather sparsely covered. Common lespedeza is present in many places as the dominant vegetation. Various other grasses and numerous forbs grow in conjunction with the predominant species but in scattered densities. Since clover is not abundant and it grows only in isolated cases, it may be an important food. Cotton and corn occupy quite a bit of ground on the study area. Other crops are peanuts and sweet potatoes.

TABLE NO. IV

PLANTS EATEN BY CAPTIVE RABBITS

GEISMAR-STUDY AREA NO. 1—ASCENSION PARISH

No.	Common Name	No.	Common Name
1	White Dutch Clover	13	Greenbrier
2	Bermuda grass	14	Rushes
3	Carpet grass	15	Sedges
4	Foxtail grass	16	Lesser Ragweed
5	Baya grass	17	Peppervine
6	Dallis grass	18	Wild verbena
7	Giant Ragweed	19	Blackberry
8	Cocklebur	20	Smartweed
9	Beggarweed	21	Peppergrass
10	Dichondra	22	Yankeeweed
11	Arrowweed	23	Poison ivy
12	Plantain	24	Shrub dogwood

Plant Numbers 1-5 were decidedly preferred of the group obtainable and seem to form the main diet along with plant Numbers 6-9. Plant Numbers 10-14 are eaten if the rabbits are rather hungry and if no other plants are available. Numbers 15-17 were only nibbled and it is presumed that the palatability is low. As an emergency food the sledges may stay succulent for a longer period due to the drainage water and these might be utilized during late fall and winter.

Plant Numbers 18-23 were passed over entirely and the animals refused to eat them even when no other food was available. Verbena and dewberry might be utilized to some extent as an emergency food as indicated on the Geismar study area. Broomsedge is used slightly and only when green. As a cover it is good.

Although woody vegetation was available, only one plant, persimmon, was eaten. This was not voraciously taken as a desirable food.

TABLE NO. V

HERBACEOUS AND WOODY VEGETATION EATEN BY CAPTIVE RABBITS DURING SEPTEMBER-OCTOBER 1953—CLINTON, LA. STUDY AREA

No.	Common Name	No.	Common Name
1	Carpet Grass	19	Nettle
2	Bermuda	20	Bitterweed
3	Lespedeza bicolor	21	Smartweed
4	Lespedeza common	22	Yankeeweed
5	Goosegrass	23	Verbena (wild)
6	Vasey Grass	24	Dewberry
7	Grape	25	Broomsedge
8	Partridge pea	26	Goldenrod
9	Maypop	27	Fleabane (flowers only)
10	Pokeweed	28	Live oak
11	Dock (leaves only)	29	Persimmon
12	Goatweed	30	Hickory
13	Crossvine	31	Rattan
14	Sesbania	32	Sassafras
15	Lesser Ragweed	33	Sumac
16	Sedges	34	Yaupon
17	Smutgrass	35	Wax myrtle
18	French Mulberry		

Table V depicts the plants eaten on the supplementary area near Baton Rouge. This table shows preference for the plants available.

Plant Numbers 1-8 were decidedly preferred as indicated by small patches being completely devastated. Numbers 8-15 were eaten readily as evidenced by examination of the plants. Numbers 16-20 were tasted or nibbled but not utilized to any extent. Plant Numbers 21-25 were not touched. While the rabbit was being observed, several of the plants in the pen were eaten. This observation could not be made with a free wild rabbit.

TABLE NO. VI

BATON ROUGE SUPPLEMENTARY AREA—TERRACE SOIL TYPE PLANTS EATEN BY CAPTIVE RABBITS

No.	Common Name	No.	Common Name
1	Arrowweed	13	Niggerhead (flowers)
2	Vasey grass	14	Sweetgum (sprouts)
3	Bermuda	15	Lesser Ragweed
4	Lespedeza	16	Smutgrass
5	Buttonweed	17	Sedge
6	Wiregrass	18	Plantain
7	Goosegrass	19	Maypop
8	Virginia creeper	20	Sheepsorrel
9	Japanese honeysuckle	21	Ironweed
10	Trumpet creeper	22	Poison ivy
11	Panic grass	23	(Pennywort)
12	Threadsafter		

Life History Studies

The life history studies of this project have been made to determine the length and time of the breeding season and the development of young to sexual maturity. The five phases of the life history studies are:

1. Determine nest habitat and construction,
2. Breeding characteristics,
3. Development of young,
4. Mortality,
5. Determine sex and age ratios.

The progress made on each phase will be made in the above order.

Nesting Habitat and Construction

Nests of the cottontail rabbit have been found in three types of cover. During the early spring, nests were found in corn and cotton fields that lay fallow over winter. This nest site is destroyed by spring plowing. Other nests have been found in brush or other patches of dense cover in pastures or have been located in open pasture with no cover within a radius of 75 feet.

It would seem that the cottontail has no distinct type of cover or habitat in which to build its nest. To date, no nests of swamp rabbits have been discovered. For a diagram of a cottontail nest found near Clinton, Louisiana see figure No. 1. Other nests found were shallow cup shape depressions of the same diameter (5 inches), but only about 3 inches deep. All nests were lined with fur and grass.

Breeding Characteristics

Information on breeding is gathered from laboratory autopsy, field examinations and observations. The number of young per litter seems to decrease during the late summer and fall. The average number of young per litter over 2 month periods is given below:

Months	Number of Embryos or Young
January 1-February 28	3
March 1-April 30	4
May 1-June 30	4
July 1-August 31	3.67
September 1-October 31	2.8
November 30-December 31	No Data
Yearly Average	3

The last breeding recorded from laboratory autopsy was set at or about September 25, 1952. There are two records of rabbits breeding during the first two months of the year. One breeding date was set between January 13-18 and the other February 12-16. These dates are not conclusive as they are subject to change as more data is gathered.

Development of Young

A growth study was made on captive rabbits in order to determine the rate of growth of young rabbits to maturity. Although some data was gathered, the project was not a complete success as the young rabbits died in captivity from unknown causes. The weight in grams and the crown-rump length in millimeters was taken at regular intervals. The results are presented in the following table:

Growth Data for Young Cottontail

Age in Days	Weight (grams)	Crown-Rump Length (Millimeters)
6	36	103
12	46	109
16	53.5	111
29	217	178
34	227.3	200
41	284	215
51	369.2	234
55	426	235
60	454.4	257
67	497	269

When compared with the Kentucky Size Graph for cottontail rabbit growth, the captive cottons of this area were heavier and larger at ages equal to those on the graph. This difference was slight, and more data must be collected before any conclusions can be drawn.

Mortality Causes

During the duration of the project, the co-leaders have seen only one rabbit so heavily infected with parasites it would have died. This was an immature cottontail collected near Clinton, Louisiana. The liver was very heavily infected with a liver flatworm tentatively identified by Dr. L. S. St. Amant and Mr. Kenneth Biglane as *Dicrocoelium sp.* The common rabbit tape worm tentatively identified as *Cittolaenia sp.* and *Cysticercus* of the dog tape worm were found but never in serious infections. Of the external parasites, ticks, *Haemophysalis;* lice, *Haemodipsus;* and fleas, *Spilopyallus* have been found on the rabbits examined, but never in excess numbers. There has been no evidence of a rabbit being infected by tularemia.

Mortality has resulted from the following causes as observed by the co-leaders or being reported by responsible persons. A summary of the causes of mortality and the various ages of rabbits affected are presented below:

Deaths Due to Unnatural Causes*

Cause of Death	Age Class of Rabbit		
	Nesting	Young	Adult
Agricultural Operations	..	..	..
Spring Plowing	X	..	..
Mowing and Cutting Weeds	X	X	X
Cattle Grazing	X	..	..
Harvesting Grass Seed	X	X	..
Highway (Killed on)	..	X	X
Hawks	..	X	X
Dogs	X	X	X
Very Heavy Rains	X	X	X

* Evidence or direct observations of deaths were seen by co-leaders in field or reported by responsible persons.

Sex and Age Ratios

During the period this project has been in operation, every rabbit examined was sexed and aged if possible. The sex ratio at present is 77.5 males to 100 females. The sex and age ratios by seasons have not been computed because information is not adequate at the present time. The sex ratio given above is not final, but subject to change as data is collected.

Project 27-R
Squirrel Investigations

Introduction

The squirrel population, like most game species, has gradually declined in past years. In view of the fact that squirrels are one of our more important game species, a research project was initiated in Louisiana to secure information that might be used in managing the species in the future.

Briefly this project is gathering information on breeding seasons and litter sizes, population densities, hunter success and kill and movements of squirrels through trapping and tagging.

There are five races of squirrels found in Louisiana. They have been identified as (1) Gray or cat squirrels, *Sciurus carolinensis carolinensis*, and *Sciurus carolinensis fuliginosus;* (2) Fox squirrels, *Sciurus niger bachmani, Sciurus niger subaratus* and *Sciurus niger ludovicianus.* The fox squirrels interbreed freely where their ranges overlap; the two races of cat squirrels will likewise interbreed. All the races of fox squirrels occur in two color phases—red and black. The black phase, however, is more prevalent in *Sciurus niger subauratus.* It should be pointed out that cat squirrels and fox squirrels do not interbreed. The off colors of black, brown and red that are found in the fox squirrels are merely melanistic phases of the species and are often the results of offspring that are produced where two races overlap.

Project 27-R-1, squirrel investigations, was initiated as a full-time project on July 1, 1953. The report following covers the entire life of the project—a six-month period from July, 1953 through December, 1953. During this short period some valuable information has been gathered. However, the results, up to date, are not conclusive enough in which to formulate any definite ideas;

this study will have to extend over a period of years before proper management recommendations can be made.

Breeding Studies, Age and Sex Ratios

Table I is a summary of age, sex ratios and breeding conditions of adult females. A total of 1,693 squirrels were examined to gather this information.

TABLE I

AGE AND SEX RATIOS AND BREEDING CONDITION OF ADULT FEMALES

Fox Squirrels
Number Examined 1,005

	Male	Female	Adult	Immature	Adult Females	
					Breeding	Non-breeding
No. Examined .	526	479	545	460	118	116
Per Cent	52.3	47.7	54.2	45.8	50.4	49.6

Gray Squirrels
Number Examined 688

	Male	Female	Adult	Immature	Adult Females	
					Breeding	Non-breeding
No. Examined .	368	320	366	322	96	66
Per Cent	53.4	46.6	53.2	46.8	59.2	40.8

Squirrels were classed as breeding if milk could readily be squeezed from the teats and/or if a pregnant condition existed. All others not found to be in the condition previously mentioned were classed as non-breeders.

It may be seen from Table I that for both the cat and fox squirrels a slight preponderance of males seem to exist. Of the 1,005 fox squirrels examined, 52.3 per cent were males; from 688 gray squirrels 53.4 per cent were males. The adult-immature ratios were as follows: Fox squirrels 54.2:45.8; Cat squirrels 53.2:46.8.

In the case of the breeding females it may be seen that 50.4 per cent of the adult fox squirrels were classed as breeding, the gray squirrel figure was 59.2 per cent breeders. This represents squirrels that were examined during the months of August, September, October, November and December. If this breeding data is presented by months it is noted that there was a gradual decrease in the number of breeders as the seasons progress. The smallest number of breeding females occurred in the month of November.

Presented below are the litter sizes as determined by placental scars, foetus counts and nest examination. The average by each method is as follows:

FOX SQUIRRELS

Placental Scars	2.1 young per litter
Foetus Counts	2.8 " " "
Nest examination	3 " " "

GRAY SQUIRRELS

Placental Scars	3.0 young per litter
Foetus Counts	3.0 " " "
Nest Examination	3.5 " " "

Population Densities

There were six 20 acre study areas set up in the parishes of Union, Grant, and Pointe Coupee. These areas were censused monthly to secure figures that might indicate the density of squirrels in the state.

Along the lower Mississippi and Atchafalaya river bottoms, the census figures revealed a range from one squirrel per 10 acres to one squirrel per 2½ acres. In the piny woods section, the average density figure was one squirrel per every seven or eight acres. The highest figures in the census conducted came from a creek bottom in central Louisiana that was closed to hunting and had mature hardwoods on the entire area. Here, the figures revealed an average of one squirrel per acre.

Squirrel Hunter Success 1953-54 Hunting Season

During the 1953-54 hunting season a total of 1,299 hunter bag checks was made in 18 parishes of the state. This data was collected through the cooperation of all the Pittman-Robertson personnel.

Table II presents an analysis of the bag check data collected. The average kill per hunter effort was 1.8 squirrels for the entire state. This seems rather low and was probably due to the dry condition that prevailed during October when the season first opened.

TABLE II

SQUIRREL HUNTER BAG CHECK DATA 1953-54 HUNTING SEASON

No. Hunters Checked	Type Hunting		No. Squirrels Killed		Average Kill Per Hunter Effort
	Still	Dog	Fox	Gray	
1,299	95%	5%	1,616	770	1.8

It should be pointed out here that there were twice as many fox squirrels killed as gray squirrels (1616 fox-770 gray). This is contrary to popular belief and may be explained by the fact that this state has a race of fox squirrels that live in the large swamp areas of the state. This race of squirrels thrives only in the bottomland and swamp areas of the state; it is not an open piny woods inhabitant as are most fox squirrels.

Also presented in Table II are figures which show the amount of still and dog hunting done. It is easily seen that still-hunting prevailed. However, most of the bag checks were made during the first half of the season, which accounts for the high percentge of still hunters.

Although there is no accurate way, at the present time, of determining the total kill of squirrel for the state; it is believed that a figure can be arrived at, that will at least be indicative of the kill in the state.

It is known that this state had approximately 234,000 license holders, during the 1952-53 hunting season. If the assumption is made, that the same number of licenses were sold during the 1953-54 hunting season, and that every squirrel hunter went hunting at least five times during the season; we can arrive at the following figure:

Total License Sales	234,000
Average Kill Per Hunter Effort..............................	1.8
Number of Times Went Hunting..............................	5
Total Kill	2,106,000

However, the above figure is not correct because all license holders are not squirrel hunters. If the assumption is made that only half of the license holders are squirrel hunters, then by the same calculation we arrive at the following: 117,000 X 1.8 X 5=1,053,000 Total Kill.

The above figures, of course, are purely hypothetical; but the writer strongly believes that at least a million squirrels were killed in Louisiana during the past hunting season.

Squirrels are one of the most sought after species in the state and it is logical to assume that 50 per cent of the license holders are squirrel hunters, and that each one of these hunters went hunting at least five times during the season. The figure of 1.8 squirrels killed per hunting effort comes from the average taken of 1,299 hunter bag checks, and is believed to be reliable.

Trapping and Tagging

Trapping hasn't been in full scale operation since this project was started. In the future, intensive trapping will be carried out. However, during the hunting season, one tagged squirrel was killed by a hunter. The squirrel that was tagged had moved a distance of approximately seven air-line miles from the point of capture.

A total of 95 fox squirrels and 46 gray squirrels was trapped from January 1, 1953 through April, 1953 on four refuges. The trapping was done by the refuge managers and Table III shows the trapping success on each refuge. It may also be seen from Table III that 4 gray squirrels and 2 fox squirrels were not entered in the table because the data on sex and age was not determined.

In most cases weights were kept on the trapped squirrels. Table III shows the average weights of adults and immatures for both species trapped.

In Tables IV and V the data was computed on a monthly basis for all refuges. It may be see that in both species the percentage of adults increased greatly from January through April. In the gray squirrel the adult—immature ratio changed from a 50:50 ratio in January to a 70:30 ratio in April. In the fox squirrel the ratios changed from a 43:57 per cent to a 84:16 ratio for the same months.

The number of males and females in the gray squirrels was fairly evenly distributed—23 males trapped to

TABLE III

SQUIRREL TRAPPING DATA
BY REFUGE

January 1, 1953 to May 1, 1953

	Species	Male	Female	Adult	Immature	
Union.	Fox	21	8	16	13	2 not sexed (Not entered)
	Gray	11	11	16	6	3 not sexed (Not entered)
Catahoula	Fox	11	11	21	1	
	Gray	12	18	16	4	1 not aged (Not entered)
Jackson-Bienville.	Fox	9	3	9	3	
	Gray					None trapped
Evangeline . . .	Fox	16	14	23	7	
	Gray					None trapped

Average Wt. of Gray Adult=506.2 grams (Based on 27 wts.)
Average Wt. of Gray Immature=410.0 grams (Based on 6 wts.)
Average Wt. of Fox Adult=778.1 grams (Based on 69 wts.)
Average Wt. of Fox Immature=608.6 grams (Based on 15 wts.)

TABLE IV

GRAY SQUIRREL TRAPPING DATA
FOR ALL REFUGES — BY MONTHS

	Male	Female	Adult	Immature	Male Adult	Male Immature	Female Adult	Female Immature	Adult Females		
									Breeding	Non-breeding	Not Determined
January	4	2	3	3	3	1	0	2			
	67%	33%	50%	50%	75%	25%	0	100%			
February*											
March	11	8	17	2	7	4	4	4	4	0	
	58%	42%	90%	10%	64%	36%	50%	50%	100%	0%	
April	8	9	12	5	7	1	5	4	4	0	1
	47%	53%	70%	30%	88%	12%	56%	44%			
Totals	23	19	32	10	17	6	9	10	8		1
	54%	46%	77%	23%	74%	26%	47%	53%			

*None Trapped.

19 females. In the fox squirrel, however, there was a total of 57 males trapped as compared to 36 females.

Of the nine adult female gray squirrels that were examined eight were classed as breeding and one was not determined. There was a total of 25 adult females for squirrels examined. Of these, nine were classed as breeding, 12 as non-breeding and four were not determined.

For both species the best trapping success came during the months of March and April. The bait most readily taken was pecans.

TABLE V
FOX SQUIRREL TRAPPING DATA
FOR ALL REFUGES — BY MONTHS

	Male	Female	Adult	Immature	Male Adult	Male Immature	Female Adult	Female Immature	Adult Females		
									Breeding	Non-breeding	Not Determined
January	3	4	3	4	2	1	1	3			1
	43%	57%	43%	57%	67%	33%	20%	80%			
February	11	2	6	7	6	5	0	2			
	85%	15%	46%	54%	55%	45%	0	100%			
March	21	14	28	7	15	6	11	3	7	1	3
	66%	34%	80%	20%	72%	28%	79%	21%			
April	21	16	31	6	18	3	13	3	2	11	
	57%	43%	84%	16%	86%	14%	81%	19%			
May*	1		1		1						
Totals	57	36	69	24	42	15	25	11	9	12	4
	62%	38%	75%	25%	74%	26%	70%	30%			

*There was only one squirrel trapped in May. This occurred on May 1, 1953.

Project 28-R
Quail Study

Since white settlers first arrived in Louisiana the quail population has undergone considerable changes. Early records indicate that the virgin forests supported few quail, and that these birds were more numerous around clearings cultivated by Indians.

As the forests were cleared and agriculture spread over the state, quail numbers showed remarkable response to this development of new habitat. Exactly when the peak population was reached will probably never be known, but it is generally agreed that quail numbers were generally high from 1915 until 1930.

What factors have been responsible for the recent steady decline in quail numbers? The wildlife technician can sum up the ills of the present day quail hunter by saying, "The changing pattern of land use." He can go further and point to evidences of this changing pattern such as: Present farming methods; increased cattle production; the re-establishment of timber stands and the accumulated rough of perennial grasses that dominate most of our unreforested pine lands.

That farms where row cropping is the principal land use now generally supports less quail than they did a score of years ago, is evident to the hunter and farmer alike. Cleaner farming, larger field size, more complete utilization of the land for crops, and mechanized farming are the generally apparent causes for this change.

Cattle farming has grown into an industry more and more dependent upon year-round pastures and less often complemented by row crops. Today, emphasis is placed on improved pastures and full use of these pastures for grazing. This type of farming usually provides little suitable quail habitat.

The economic need to re-establish cut-over forest lands with commercial timber has been partly fulfilled. As these timber stands approach maturity, their carrying capacity for quail is greatly lessened. Local populations, that reached a peak a few years after virgin pine stands were harvested, have in many instances almost completely disappeared.

In cut-over lands, that have not yet been returned to full timber production, much of the present quail hunting takes place. Yet, these lands are not producing quail in the numbers they are capable of producing. The principal reason for this is the encroachment of perennial grasses that create roughs, too dense for quail to move freely about. These roughs also greatly hinder production of quail food plants.

The farmer, the cattlemen, and even the manager of maturing timber, can, if willing, devote a small portion of their lands to food and cover plots, and increase their quail population. Often they can use land that has low value for the primary land use for this purpose. The bicolor or shrub lespedezas have been used to advantage in projects of this nature. In every case, the land owner must go to some trouble and expense in creating good quail habitat when supplemental food strips are used.

The basic problems, though pretty well understood, appear to have no clear cut solutions that will help the average quail hunter. The best possibility for quail development work to aid public hunting seems to be in the cut-over pine lands. The two major uses of this type are preproduction of commercial timber and utilization as livestock ranges. Neither of these uses are as demanding of intensive production as, for example, the alluvial flood plains. Most of these lands very recently supported respectable quail populations, and research has indicated that good management can considerably increase present population levels.

During 1953 groundwork was prepared for a quail research project, that is designed to provide some of the answers that are necessary before wide-scale development work is feasible. An area of slightly more than 7,000 acres was mapped and judged to be representative of the cut-over longleaf type of Louisiana. A vegetative type map of this area is being completed, and a post-hunting season quail census will be conducted. A check on the kill from the area during the 1953-54 hunting season is being maintained.

The quail study is being conducted to determine the most practical and inexpensive method of management that can be applied to all of the lands of the state, of this type. The management methods under consideration are adapted for use where timber growing and/or cattle production are the primary land uses.

The area will be divided into four nearly equal portions with comparable amounts of cover and open land. These portions will be treated as follows:

Study Area 1—Prescribed Burning

Fire will be used on approximately a three-year cycle, when burning is not contrary to the dictates of sound timber management. Fire has been found to be a valuable tool of management, for both timber and cattle grazing, in this type. The timely use of prescribed burning is known to benefit quail range and will be used for this purpose.

Study Area 2—Disking

This area will be partially disked along the contours. New strips will be disked the second year, and thereafter disking will be done on a two-year cycle. Part of the broken land will be sown to common lespedeza, and fertilized at the rate of 200 pounds per acre with a complete chemical fertilizer.

Study Area 3—Artificial Feeders

Artificial game bird feeders will be placed and maintained during the life of the project. They will be checked at two week intervals. They will be located in suitable cover, in an attempt to create covey range where none exists, by supplementing food.

Study Area 4—Control Area

One part of the area will not be improved, but will be maintained as a check on natural population fluctuations. This control is to enable a better understanding and interpretation of the data gathered from measurements of populations on improved parts.

In addition to keeping a careful cost record by which the various types of management can be compared, additional data will be gathered during the course of the project. It is expected that a refinement of the present techniques will be developed, that may allow more than one method under investigation to be used on the same land with an accurate prediction of costs and results.

Project FW 1-R-1
"A Statistical Survey of Game and Fish Harvest and Management Data"

The preliminary work on this project did not get underway until the summer of 1953 although it had been tentatively set up considerably earlier. As nothing like it had ever been done before by the Louisiana Wild Life and Fisheries Commission it was necessary to spend considerable time and effort in collecting information from various states and agencies concerning the many aspects and problems entailed in this type of project. Some of this information was obtained by corresponding with other state game departments and/or statistical institutes. Dr. St. Amant was also able to visit several states which had already initiated somewhat similar projects and valuable information was obtained in this manner. The Project Leader transferred from his position as leader of another project to take charge of Project FW 1-R in August 1953.

The purpose, as indicated in the title, is to obtain statistically sound information from a survey that will cover the various types of hunting and fishing over the entire state. This information will include daily and seasonal kill or catch of the different species of game birds, animals and fish as well as the amount of time expended on the various types of hunting and fishing. The information will be broken down by parishes so that it will be possible to more or less pinpoint our areas of greatest hunting and fishing pressure and have a clear picture of the return per day for the hunting and fishing effort expended in the different parishes. It is planned to secure this information by sending out a mail questionnaire to approximately 10 per cent of the hunting license holders of the state. This will be done on a modified basis although it will be stratified by parishes in order to make sure that we have equivalent coverage in all areas of the state.

One of the chief problems in a project of this type is the absolute need for adequate statistical supervision. After much correspondence with different states and various statistical institutes it was decided that in our case it would be much better if a statistician in this locality could be secured in order that the various problems could be discussed without delay as they arose. Joseph P. Montgomery, an experienced statistician who also teaches courses in the subject in the department of agricultural economics at Louisiana State University, was retained to act as statistical consultant for the project.

The mail questionnaire covering the game species will be sent out as soon as possible after the close of the 1953-54 hunting season. As these are returned they will be edited (to eliminate obvious errors, spoiled questionnaires, etc.) and processed for transfer of data to punch cards. The information will all be punched on cards in order to allow the use of business machines in tabulating the various items as this method will result in a great reduction in both the time and labor required. The time factor is particularly important as it is desired to have the information from the previous hunting season tabulated and placed in useable form before the following season. The reduction of time and labor will also result in lowering the overall cost of the project. As we anticipate around 7,500 answered questionnaires with about 50 items on each questionnaire it is obvious that the use of the business machines is the reasonable solution.

As soon as possible after the game questionnaires are mailed out work will commence on the fishing questionnaires. These will probably be mailed out in August and will be processed and handled in similar manner to the questionnaires on hunting. The project is set up on a three-year basis and the work will be more or less evenly divided between the hunting segment, handled mostly in spring and summer, and the fishing segment, handled during fall and winter.

When the information has been placed on the punch cards and the data has been tabulated and the necessary charts, graphs, etc. have been prepared, the results will be subject to analysis and interpretation and a final report will be written by the project leader. He will work closely with the statistical consultant in order that these results will stand up under reasonable criticism from other statisticians and/or biologists. The information thus obtained, by providing an accurate picture of our game kill and hunting and fishing pressure throughout the state, will give the Louisiana Wild Life and Fisheries Commission a sound basis for advocating, allocating and carrying out game management work where most needed by the most people.

Land Development

Supervisor: Carroll J. Perkins

Project 6-D, Farm Game Habitat Improvement

Leader: Kenneth C. Smith*
Assistant: Jack Sims
Assistant: Ray Rogers
Assistant: Henry Roberts

Project 23-D, Development of Wildlife Management Areas

Leader: Carroll J. Perkins
Assistant: Clyde E. Harrison
Assistant: Rowland P. Vernon

Project 6-D

Farm Game Habitat Improvement Program

Project Leaders: Charles R. Shaw, Kenneth C. Smith, (Southeast Dist.)

District Biologist: Henry D. Roberts, (Northwest Dist.)

District Biologist: Jack A. Sims, (Southwest Dist.)

District Biologist: Ray M. Rogers, (Northeast Dist.)

Quail hunting is, without a doubt, one of the most important forms of recreation in the southeastern United States. Many thousands of dollars are spent each year in the pursuit of this great sport in spite of the fact that there has been a steady decrease in the amount of suitable range for these game birds since the late 1930's. By suitable range we do not mean smooth, clean pastures, denuded fence rows, eroded gullies and fields heavily carpeted by rough, impenetrable grasses and weeds.

habitat. Add this to the increase in farm size and trend toward mechanization which replaces the tenant farmer and his work animals, thereby drastically reducing small pea and corn patches. Consider the ease with which the increasing numbers of sportsmen can cover the country in search of quail, bringing heavy pressure to bear on existing game. This means either produce more quail or relegate them to a position of minor importance as a game species.

	1950	1945	1940	1935	1930	1925	1920
Average farm acreage	90.2	77.6	66.6	61.4	57.9	66.7	74.0
Total Acres in Pasture	4,759,679	3,920,572	(*)	2,795,843	2,234,687	1,709,231	(*)
Tractors	35,735	17,630	9,476	(*)	5,016	3,482	2,812
Horses, mules and ponies	233,288	293,226	317,282	320,106	319,394	304,827	358,871
Cattle and Calves	1,284,616	1,475,425	1,051,901	1,081,647	729,690	696,571	804,241

(*) Figures not available.
1950 Census of Agriculture, U.S. Dept. of Commerce, Bureau of the Census, U.S. Government Printing Office, 1952, Vol. I, Part 24.

Some of these situations have come about as a result of land owners following recommended agricultural practices and others through neglect and mismanagement but it all adds up to the same thing—shrinking

There are two major approaches to the problem of greater quail production. Either open up more range to the quail, such as developing cut-over pine lands, or improve that which is available, our farm lands. The latter is the goal of the Farm Game Habitat Improvement program.

As described in the 1950-51 Biennial Report, the Farm Game Program was begun in 1942 with limited personnel and progressed to the point where five technicians, the project leader and four district biologists, were conducting the work in 1950. No more personnel were added up to Jan. 1, 1954, but two biologists, Glen Futch who resigned Jan. 15, 1952, and Frank Darsey who resigned Feb. 15, 1952, were replaced by Henry D. Roberts, March 15, 1952 and Ray Rogers, May 1, 1952. Charles Shaw, project leader since 1948, took the leadership of another project in July of 1953 and was replaced by one of the district biologists.

At the risk of repeating material covered in previous biennials, the organization and operation of the Farm Game Program must be reiterated in order to give a clear picture of the project. As of July 1, 1950, the State was divided into four districts (see map) with a biologist assigned to each district to supervise distribution, planting and inspection of the supplemental food plantings. Working through the Soil Conservation Service, the Agricultural Extension Service and various wildlife organizations the biologists contacted as many landowners as possible who had requested planting material and inspected the sites to be planted. After the site was selected, the landowner or other interested persons were notified by either the county agent or work unit conservationist as to when he might expect the planting materials. The Louisiana Wild Life and Fisheries Commission supplied the agricultural agencies with the material and the agencies in turn either made individual deliveries or notified the interested individuals where the seedlings and/or seed might be picked up. The people receiving the seedlings were cautioned to "heel in" the plants to prevent them from drying out. After the food strips were established the biologists inspected as many as possible in order to encourage the landowner to take necessary steps to make the border a successful one. Also information sheets showing condition of plants, length of strip, wildlife utilization and other pertinent information were kept on each border.

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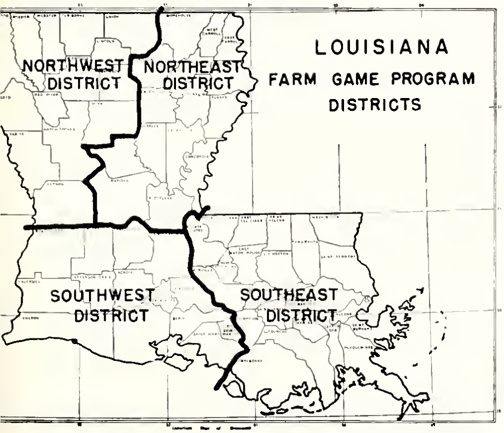
* Charles Shaw leader until June, 1953. Transferred to leadership of Project F-W-1R.



As the name implies, the Farm Game Habitat Improvement program was conducted to benefit all farm game species, but the major emphasis was on quail. It has been determined that one of the major obstacles in the production of more quail per acre is the lack of food and cover. There are other factors contributing to low populations, such as predators, disease, unwise use of fire, and gunning pressure, but all are of relatively minor importance compared to the food and cover problem. Many states, including Louisiana, have found the restocking of pen-reared game birds to be an unsound game management practice and have sought down to earth answers in improving quail populations.

Recent years have seen the introduction and development of shrub lespedezas that are well adapted to the southeastern United States. The most popular of these legumes is *Lespedeza bicolor*, a plant with many desirable characteristics. The nutritive seed mature late in the fall and are available through the winter and early spring when the food supply is at its lowest point. The plant is a perennial and once established needs a minimum of attention. It is very hardy, little affected by drought and disease, will do well on poor soils, and is not seriously affected by competitive vegetation once maturity is attained. Certain disadvantages are to be recognized with bicolor. It must be protected from cattle, must be properly maintained through the first growing season and is subject to damage by pocket gophers.

The amount of bicolor necessary to establish a successful border is 1,000 seedlings. This is enough to support the average covey of quail. It is recommended that these plants be set two feet apart in the row, the rows should not be more than four feet apart and not less than three rows and preferably five to the strip. Scattered plantings do not tend to attract quail.

A native lespedeza bicolor field border.

Fertilization is preferable but not always necessary in establishing a bicolor strip. One hundred pounds to the strip, which occupies approximately one-fourth acre, is sufficient and this should not contain over three per cent nitrogen since the plant is a legume and provides its own supply of this element. Commercial fertilizers usually recommended are 0-12-12 or 3-12-12.

By Jan. 1, 1952, one million four thousand bicolor seedlings were available for the '52 planting. These plants had been obtained from the Louisiana Wild Life and Fisheries Commission nursery at DeRidder. This nursery is under the supervision of District Biologist Jack Sims who is assisted by the nursery foreman, on regular salary, and temporary labor hired whenever the occasion arises. Louie Hickman was nursery foreman and tractor operator until October of 1952, when he was replaced by Sam Slayden.

There are approximately 30 arable acres in the nursery and at present 20 are under cultivation and supplied with water during the dry months by an extensive irrigation system. The water is pumped from a pit formerly used as a reservoir and relayed through aluminum pipes to various part of the nursery.

Because of extensive rains during the growing season, the first seeding in 1952 was ruined and the seedlings from the second did not attain a height of more than three inches before the first early frost. These were held over until the following year. Six hundred thirty three thousand plants were obtained from out of state for the 1953 planting. Tables at the end of this report give the breakdown on number of plants delivered in each district.

Bad weather conditions also prevailed in 1953 which caused the nursery to be seeded twice. Following each seeding there were unusually heavy rainstorms in the area which packed the soil so firmly over the germinating seed it was impossible for the young plant to emerge. Partly responsible for the failure of the nursery was the use of a planter that could not be adjusted to plant at the proper depth. New equipment has been requisitioned which should rectify this situation.

It has been the practice of the 6-D biologists to distribute *Lespedeza cuneata* (sericea) seed along with the bicolor. Where the need was evident a five-pound bag of sericea was distributed to be planted adjacent to the bicolor. This provided nesting cover near the food strip.

A considerable amount of time was spent in the last quarter of 1952 by the personnel of the farm game program in the construction of 1200 squirrel nesting boxes. There were several reasons behind the construction and distribution of these boxes. It is believed the 4-H club members to whom the boxes were given will become more interested in the management of the game on their farms. Also the young squirrels can be counted, examined and tagged by anyone interested in such information as litter size, sex ratio, range and other pertinent data. Although the boxes will not greatly increase the population of the state as a whole, they definitely will aid in holding the animals on timber tracts where all den trees have been removed.

Approximately seven hundred boxes were erected in trees by the 6-D biologists using climbing spurs to reach a height of twenty feet or more up the tree trunk, but this activity required so much of the technician's time it had to be discontinued and the remainder of the boxes were given to the boys to put up themselves.

Many of the boxes have been inspected and data recorded but as yet insufficient information has been obtained to warrant a comprehensive report. It was noted that of the boxes checked a satisfying per cent were being utilized by the squirrels.

Other activities during the past two years included lectures on wildlife management to 4-H club members at their summer camps where considerable interest was shown by these boys and girls. This is considered time well spent with the future sportsmen of the state.

Farm game personnel participated in duck, dove and squirrel hunter bag checks during the past biennium. This activity usually took place on the week-end when a greater number of hunters might be encountered.

The Farm Game Habitat Improvement work will continue in this state but not under the plan described in this report. As of Jan. 1, 1954, the Pittman-Robertson Section of Wild Life and Fisheries has gone on a District plan. This organization should greatly benefit the farm game program because each biologist in the P-R Section will be doing some of the work and consequently can better supervise and inspect the plantings.

—S.C.S. photo by Busch.

Bicolor strips separating woods from cultivated fields take little productive land from cultivation.

TABLE A

NORTHWEST DISTRICT

	Agricultural Extension Service			Borders Not Checked	Year	Soil Conservation Service			Borders Not Checked
ear	Deliveries	Success	Failure			Deliveries	Success	Failure	
8	2000	2000			48	100000	12000	8000	80000
9	11600	19000	16000	6600	49	87000	34000	16000	37000
0	146500	31000	13500	72000	50	182500	106000	63000	13500
1	64000	31000	26000	7000	51	94500	60000	27000	75000
2	54000	26000	9000	19000	52	67500	26000	9000	32500
3	51000	10000	33000	8000	53	139000	64000	7000	68000
tal	359100	119000	127500	112600	Total	670500	302000	130000	306000

TABLE B

NORTHEAST DISTRICT

	Agricultural Extension Service			Borders Not Checked	Year	Soil Conservation Service			Borders Not Checked
ear	Deliveries	Success	Failure			Deliveries	Success	Failure	
8					48	120000	4000	15000	101000
9	7200	1800	1600	800	49	66400	9000	6500	50900
0	166000	23000	113500	29500	50	200000	17000	90000	63000
1	80000	32000	23500	47000	51	71800	24900		47800
2	85000	20000		65000	52	64000		1000	63000
3	86000	15000	27000	44000	53	90000	17000	1000	72000
tal	424200	94800	165600	163800	Total	612200	101000	113500	397700

TABLE C

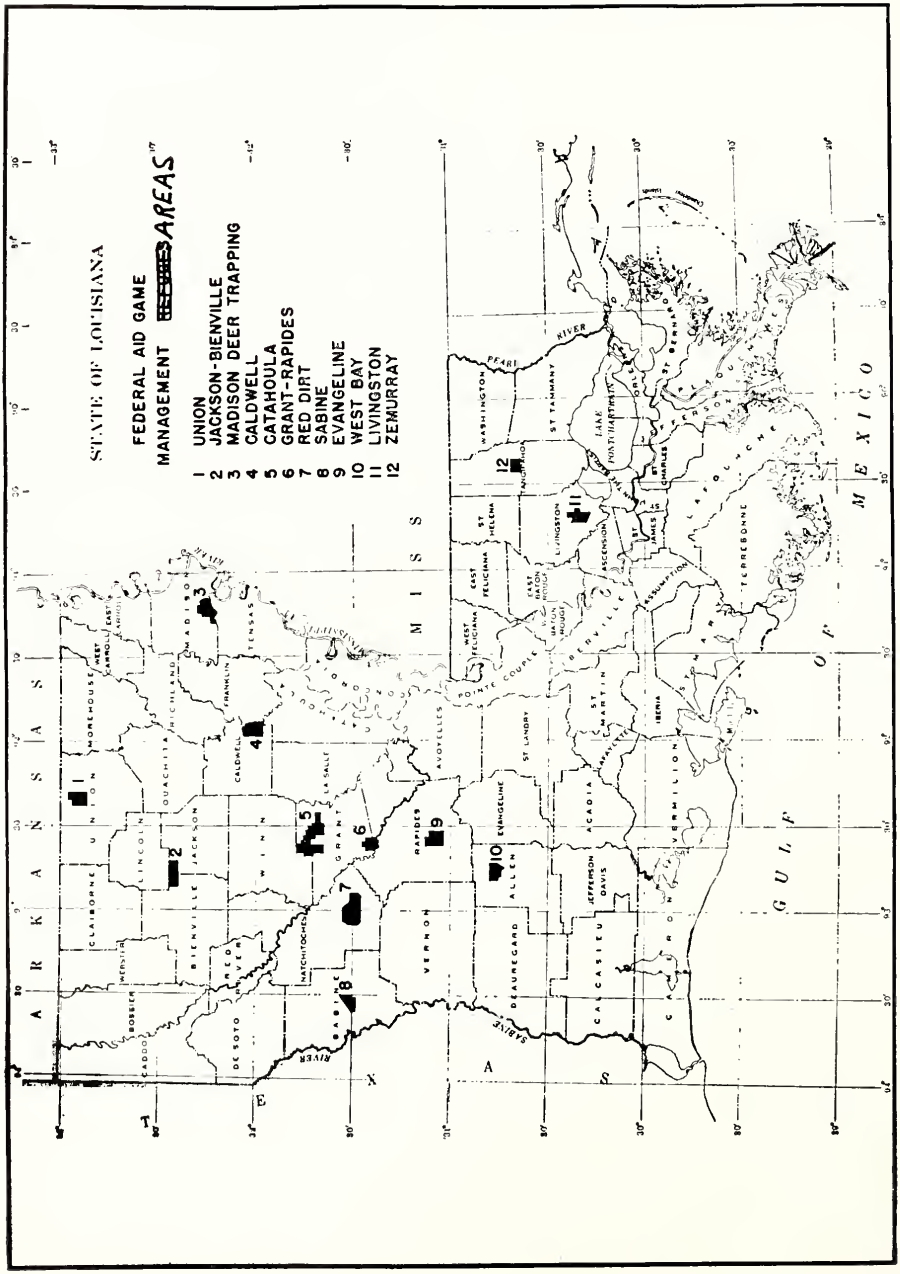
SOUTHWEST DISTRICT

	Agricultural Extension Service			Borders Not Checked	Year	Soil Conservation Service			Borders Not Checked
ear	Deliveries	Success	Failure			Deliveries	Success	Failure	
8					48	10000			10000
9	5600		3200	2400	49	12800	6800	5200	800
0	99500	36000	42000	21500	50	37000	14000	23000	
1	36000	20500	15500		51	25000	14000	7000	4000
2	30000	20000	8000	2000	52	34000	22000	12000	
3	47000	19000	11000	17000	53	50000	28000	12000	10000
tal	218100	95500	79700	42900	Total	168800	84800	59200	24800

TABLE D

SOUTHEAST DISTRICT

	Agricultural Extension Service			Borders Not Checked	Year	Soil Conservation Service			Borders Not Checked
ear	Deliveries	Success	Failure			Deliveries	Success	Failure	
8					48	25000	2000	1000	22000
9	13000	1000	4000	8600	49	12800	6000	6400	400
0	113000	14500	56100	42400	50	160000	60000	65500	34500
1	150000	43900	73100	33000	51	115000	57000	45000	13000
2	208000	70500	93700	43800	52	140000	72000	67000	1000
3	76000			76000	53	94000			94000
tal	560000	129900	226900	203800	Total	546800	197000	184900	164900


STATE OF LOUISIANA
FEDERAL AID GAME
MANAGEMENT AREAS
1 UNION
2 JACKSON-BIENVILLE
3 MADISON DEER TRAPPING
4 CALDWELL
5 CATAHOULA
6 GRANT-RAPIDES
7 RED DIRT
8 SABINE
9 EVANGELINE
10 WEST BAY
11 LIVINGSTON
12 ZEMURRAY
ARKANSAS
TEXAS
MISS
GULF OF MEXICO
PEARL RIVER
SABINE RIVER
LAKE PONTCHARTRAIN

Project 23-D

Development and Maintenance of Wildlife Management Areas

ntroduction

This is a report of the work done on Project 23-D, "Development and Maintenance of Wildlife Management Areas," for the period January 1, 1952, through December 31, 1953.

This project is the land development and land maintenance phase of the Federal-Aid in wildlife restoration program in Louisiana. The purpose of this project is to develop and maintain the maximum wildlife resources on ertain specific areas.

There are at present eleven game management areas omprising a total of approximately 180,000 acres. These are located throughout the state on private and U.S. Forest Service lands. (Table 1)

The development and maintenance work on each game management area is carried out by the refuge manager under the supervision of the game technician ollowing a work program outlined at the beginning of ach fiscal year.

In general, the work program for each game management area includes the following types of work:

1. Establishing and maintaining boundaries.
2. Constructing and maintaining fences.
3. Constructing and repairing roads and bridges.
4. Plowing fire lines and control burning.
5. Planting supplemental food and cover for game.
6. Assisting in predator control.
7. Releasing game when necessary.
8. Making experimental food and cover plantings.
9. Censusing and indexing game populations.

Other phases of Project 23-D included the investigation of proposed game management areas, the trapping nd restocking of native deer and the restocking of eer and game farm turkey purchased out of state.

In general, the development and maintenance work one on each game management area is as follows:

Red Dirt Game Management Area

. E. Harrison, *Game Technician*

I. C. Beasley, *Refuge Manager*

The Red Dirt Game Management Area, approximately 40,000 acres in size, is located on U.S. Forest Service lands in the south-central portion of Natchitoches parish.

The area contains a variety of timber types, including stands of pure pine, mixed pine and hardwood, and bottomland hardwood. Tree sizes vary from seedlings in the grass stage to mature stands of timber. The topography varies from gently rolling hills to rugged outcrops of sandstone of unusual scenic beauty.

Excellent water, food and cover are available for wildlife along the numerous spring-fed streams interspersed throughout the area.

Intensive forestry management practices have been carried out on this area for a number of years by personnel of the U.S. Forest Service. The results of this work furnish an excellent example of proper forest management.

The success of this game management program, since its inauguration in February, 1948, demonstrates the practicability of a cooperative forestry and game management program.

Deer—The deer population on this area has continued to show a normal rate of increase with no evidence of major outbreaks of diseases or parasites. Federal-Aid game technicians have made periodic surveys of deer food conditions and populations. These surveys indicate that some of the deer should be removed from this area in the near future; therefore, it is recommended that a deer trapping program be inaugurated and controlled hunting be allowed in the season of 1954.

During the 1953 season the area surrounding the Red Dirt Game Management Preserve was opened to deer hunting for a period of 10 days. It is estimated that a total of 40 to 45 legal bucks was taken in this vicinity at that time.

Turkey—A total of 165 game farm turkey has been released on the Red Dirt Game Management area. Although every known means of turkey propagation have been tried, field observations indicate that turkeys have not become permanently established on this area.

Quail—The preliminary investigation of the Red Dirt area indicated that approximately 13,000 acres were suitable to quail propagation work. It also showed that this area contained a quail population estimated at one quail per 35 acres. Prior to the period covered by this report, approximately 175 acres had been planted to quail food. These plantings were made on prepared strips 10 to 20 feet wide, of various lengths, following

Table No. 1

GAME MANAGEMENT AREAS

Name	Location (Parish)	Acreage (approx.)	Ownership	Species to Be Benefited
ed Dirt	Natchitoches	40,000	U.S.F.S.	Deer, quail, turkey
atahoula	Winn & Grant	40,000	U.S.F.S.	Deer, turkey, squirrel
vangeline	Rapides	15,000	U.S.F.S.	Deer, quail
Vest Bay	Allen	18,600	Private	Deer, turkey, squirrel
ivingston	Livingston	10,000	Private	Deer, turkey, squirrel
aldwell	Caldwell	10,000	Private	Deer, turkey, squirrel
nion	Union	10,000	Private	Deer, turkey, squirrel
abine	Sabine	8,000	Private	Deer, turkey, squirrel
rant-Rapides	Grant-Rapides	7,700	Private	Deer, turkey, squirrel
ackson-Bienville	Jackson-Bienville	15,500	Private	Deer, turkey, squirrel
emurray Park	Tangipahoa	5,000	Private	Deer

the natural contours. During the period covered by this report, these food strips were maintained, i.e., disced lightly and fertilized. Field observations revealed extensive usage of these strips by quail. The latest census indicated an average of approximately one quail per 10 acres. It is thought that this is the maximum population that can be sustained economically on this type terrain.

In addition to the above game management work, approximately 58 miles of road and jeep trails, 48 miles of fence, and 40 bridges and water gates were repaired and maintained. A total of 5,440 acres was control burned to benefit game. The residence, shop and accompanying buildings were maintained in good repair.

Catahoula Game Management Area

Rowland Vernon, *Game Technician*

Volmer Bowen, *Refuge Manager*

The Catahoula Game Management area is located on U.S. Forest Service lands in Winn and Grant parishes. It comprises an area of approximately 40,000 acres and contains a mixture of second growth longleaf, loblolly, and shortleaf pines and hardwood. The topography varies from gently rolling hills to poorly drained flats with very few streams on the area.

Deer—The deer herd on this area remained in a healthy condition with little evidence of diseases or parasitism. Field observations indicate that this area has almost reached its carrying capacity for deer, and plans should be made to reduce the deer herd.

Turkey—The Catahoula area contains excellent turkey range. A total of 178 game farm turkeys has been released on this area. These turkeys have had a fairly good rate of survival with considerable evidence of reproduction. A large percentage of these turkeys have remained on or near the game management area.

The turkeys used the area extensively. Fifty acres were cleared and planted to supplemental turkey food.

Two ponds of approximately three acres each were constructed within the turkey management area to provide watering places for game.

In addition to the game management work a total of 10.6 miles of hog-proof fence was maintained. Cattle and hogs were removed from the turkey management area, 20 bridges and water gates were repaired and maintained, 20 miles of jeep trails were maintained, 62 miles of boundary were brushed out, line trees repainted, and signs replaced whenever necessary.

A combination cabin and equipment shed was constructed.

Evangeline Game Management Area

Clyde E. Harrison, *Game Technician*

Horace Stiles, *Refuge Manager*

The Evangeline Game Management area is located on U.S. Forest Service lands in south-central Rapides parish. It contains 15,000 acres of second-growth longleaf and loblolly pines and mixed pine and hardwoods. The topography is gently rolling hills interspersed throughout with spring-fed streams.

Deer—A total of 69 deer has been released to date on the Evangeline Game Management area. Field observations indicate that the deer herd had a normal rate of increase. There has been little evidence of diseases or parasitism. No poaching has been reported It will be a number of years before this area has its carrying capacity of deer. Five plots of approximately five acres each were cleared, fenced, and planted to supplemental deer food in an attempt to hold the deer within the game management area.

The refuge manager assisted U.S. Forest Service personnel in control burning approximately one-fourth of the game management area. Although this was done primarily for the benefit of the forest, it also benefited the quail and deer on the area.

Squirrels—The refuge manager cooperated with the state-wide squirrel study by trapping, eartagging, and releasing approximately 150 squirrels.

In addition to the above game management work, approximately 17 miles of hog-proof fence, 40 miles of jeep trails, 25 bridges and water gates were maintained. The boundary line was brushed out and signs replaced wherever necessary.

A combination overnight cabin and equipment shed was constructed.

West Bay Game Management Area

Clyde E. Harrison, *Game Technician*

Ben R. Bass, *Refuge Manager*

The West Bay Game Management area is located in the north-central portion of Allen parish. It contains approximately 18,600 acres of second-growth loblolly, longleaf, mixed pine and hardwood and pure hardwood timber.

The area is relatively flat and poorly drained. In general it contains excellent deer and squirrel range and is surrounded by approximately 50,000 acres of similar game habitat.

Through cooperation with private landowners this area has been acquired by the state for game management purposes on a long term lease without fee.

The preliminary investigation showed that the area contained no deer or turkeys but a relatively high population of squirrels.

Deer—Since the inauguration of the game management program in May, 1949, a total of 193 deer has been released on the West Bay area. These deer have become well established and have had a normal rate of increase. There has been no evidence of poaching, diseases or parasitism.

Turkey—A total of 515 game farm turkeys has been released on the West Bay area. The turkeys have become widely scattered. It is estimated that 100 to 150 of these turkeys have survived. Considerable evidence of reproduction has been found.

Turkey management work on this area consisted of clearing, fencing and planting five food plots to supplemental turkey food.

In addition to the game management work done on the West Bay area, a combination overnight cabin and equipment shed was constructed. Approximately 25 miles of boundary line was brushed out and signs replaced wherever necessary, and 20 miles of roads and jeep trails were maintained in good condition. Approximately 20 bridges were repaired.

Livingston Parish Game Management Area

Clyde E. Harrison, *Game Technician*

Elliott Wild, *Refuge Manager*

The Livingston Parish Game Management area is ocated in the southern portion of Livingston parish and omprises an area of approximately 10,000 acres. It is elatively flat and poorly drained, containing a dense tand of loblolly pine, mixed hardwood, and swamplands. A number of old, abandoned fields are to be found hroughout this area.

The use of this land for wildlife management purposes has been acquired from private landowners by ong term lease without fee.

The Livingston area contains excellent deer, turkey, and squirrel range, with an original scattered stocking of deer and turkey.

Deer—Since the inauguration of this game management area in October, 1949, a total of 42 deer has been released. Although this release has been successful n so far as there has been some reproduction and little evidence of disease, there has been some evidence of poaching on the area.

Turkey—A total of 127 game farm turkeys has been released on this area. These releases have proven highly satisfactory with considerable evidence of reproduction, and this area now contains one of the highest urkey populations in the state.

A total of four food plots, with a combined acreage of approximately 55 acres, has been cleared, plowed, fenced, and planted to supplemental turkey food. All plantings have been utilized extensively by turkey.

There has been some evidence of poaching on the urkeys.

In addition to the game management work on the Livingston area, the boundary was brushed out to a width of six feet, line trees repainted and signs replaced wherever necessary, a total of 20 miles of jeep trails and 10 bridges were maintained.

A combination overnight cabin and equipment shed was constructed. This was later burned by vandals.

Caldwell Parish Game Management Area

Rowland P. Vernon, *Game Technician*

Welch Lively, *Refuge Manager*

The Caldwell Parish Game Management area is ocated in the southeastern portion of Caldwell parish. It comprises an area of approximately 10,000 acres of second-growth hardwood. The topography is relatively flat and poorly drained.

This land was leased without fee from private owners for wildlife management use.

Although this area supports a large number of cattle and hogs, it still contains good deer range.

Deer—A total of 93 deer has been released on this area since it was set up for game management purposes in October, 1949.

These deer have had a good rate of survival. Deer may be seen frequently on the game management area.

There were no deer in this part of Caldwell parish prior to these releases.

Turkey—A total of 269 game farm turkeys has been released on this area. Although there is some evidence of reproduction, field observations indicate that the rate of survival was poor.

Four food plots with a combined area of approximately 18 acres were cleared, fenced, and planted to supplemental turkey food. These plots were used extensively by deer and turkey.

In addition to the game management work, the entire boundary of the game management area was cleared of brush to a width of approximately nine feet with a D-6 Caterpillar bulldozer, line trees were repainted and signs replaced wherever necessary, approximately 30 miles of jeep trails and six bridges were maintained. A combination overnight cabin and equipment shed was constructed.

Union Parish Game Management Area

Rowland P. Vernon, *Game Technician*

Curtis L. Hollis, *Refuge Manager*

The Union Parish Game Management area is located in north-central Union parish and comprises an area of approximately 10,000 acres. It contains second-growth loblolly and shortleaf pine and mixed hardwoods with a heavy growth of underbrush and is interspersed throughout with numerous spring-fed streams. The topography is rolling hills with a top soil of sandy loam.

Use of this land for wildlife management purposes was obtained from private owners by long term lease without fee.

This type of habitat is excellent for deer and turkey propagation.

Deer—Prior to release there were no deer in this part of Union Parish. Since the inauguration of this project a total of 67 deer has been released.

These releases have been highly successful and the area contains a good stocking of deer at present.

Turkey—A total of 144 game farm turkeys has been released on this area. Although the rate of survival was low, there has been some evidence of reproduction. At present it is reported that there are at least three flocks of turkeys in the vicinity of the Union Parish Game Management area.

A total of five food plots with a combined acreage of 25 acres has been cleared, fenced, and planted to supplemental turkey food. These plantings have been used extensively by deer and turkeys.

In addition to the game management work, the boundary was brushed out, line trees repainted and signs replaced wherever necessary, 30 miles of roads and jeep trails and 15 bridges were maintained. A combination overnight cabin and equipment shed was constructed.

Sabine Parish Game Management Area

Clyde E. Harrison, *Game Technician*

Lloyd Alford, *Refuge Manager*

The Sabine Parish Game Management area is located in south-central Sabine Parish and comprises an acreage of approximately 8,000 acres. In general this tract of land is well drained with an abundant supply of water in the form of creeks. It contains good stands of second-growth longleaf, shortleaf, and loblolly pines and mixed hardwood.

This land was acquired for wildlife management purposes by long term lease from the private owners. It was established as a Federal-Aid game management area in the spring of 1951.

Deer—A total of 57 deer has been released on the Sabine area. This release has been fairly successful with a good rate of survival and reproduction. There has been little evidence of disease, parasitism, or poaching.

Turkey—A total of 230 turkeys has been released on the Sabine area. Turkey survival has been limited with some evidence of reproduction.

In addition to the release of game on this area, the entire six-foot right-of-way around the boundary has been maintained, line trees painted and boundary markers replaced wherever necessary. Approximately 20 miles of roads and jeep trails and 15 bridges were maintained.

Grant-Rapides Parishes Game Management Area

Rowland P. Vernon, *Game Technician*
Thomas Earl Deen, *Refuge Manager*

Development work was begun on May 1, 1951, on the Grant-Rapides Parishes Game Management area. It comprises an area of approximately 7,700 acres, located along the east bank of the Red River in Grant and Rapides parishes.

In general, the area is flat and poorly drained, with an abundant supply of water furnished by bayous. It contains an excellent stand of Red River bottomland hardwoods, with a heavy stand of undergrowth and interspersed throughout with old, fallow fields.

The use of this land for wildlife management purposes was obtained from the owners by long term lease without fee.

Deer—A total of 50 deer has been released on this area. There has been a good rate of survival with no evidence of diseases, parasitism, or poaching.

Turkey—A total of 48 game farm turkeys has been released on this area. The rate of survival was very poor.

Two food plots with a combined area of 11 acres, were cleared, fenced, and planted to supplemental turkey food. These food plots were used to some extent by deer.

In addition to the game management work, the boundary around the entire game management area has been brushed out, line trees repainted, and signs replaced wherever necessary. Approximately 15 miles of jeep roads and five bridges have been maintained.

A combination overnight cabin and equipment shed was constructed on this game management area.

Jackson-Bienville Parishes Game Management Area

Rowland P. Vernon, *Game Technician*
Floyd Sizemore, *Refuge Manager*

Development work was begun on the Jackson-Bienville Parishes Game Management area on June 1, 1951. It comprises an area of approximately 15,500 acres, located in the northwest corner of Jackson and the northeast corner of Bienville parishes.

The terrain is rolling hills with numerous spring-fed streams. It contains a mixture of loblolly and shortleaf pines and hardwood, with a heavy understory of brush. The habitat is excellent for deer, turkeys, and squirrels.

Deer—A total of 40 doe deer, trapped in Madison parish, was released on this area. This area already contained a fair stocking of native deer. The deer have had a good rate of survival, with no evidence of diseases, parasitism or poaching.

Turkey—A total of 108 game farm turkeys has been released on this game management area. These have had only a fair rate of survival with little evidence of reproduction.

Four food plots, comprising 20 acres, have been cleared, fenced, and planted. These were used extensively by deer, and to a limited extent by turkeys.

In addition to the game management work, the boundary has been brushed out, line trees repainted, and signs replaced wherever necessary. Approximately 20 miles of roads and jeep trails and 15 bridges have been maintained.

A combination overnight cabin and equipment shed was constructed on this area.

Zemurray Park Deer Propagation Area

Clyde E. Harrison, *Game Technician*
Fred Joiner, *Refuge Manager*

The Zemurray Park Deer Propagation area is a 5,000-acre tract of land, located in central Tangipahoa parish. The terrain is gently rolling and well drained, with numerous small spring-fed streams. The timber types vary from stands of second-growth longleaf pine to stands of mixed hardwood in the creek bottoms.

The entire area is surrounded by an eight-foot deer-proof fence. The use of this land for deer propagation work was obtained from the owner by long term lease without fee.

Within the last decade, this area contained a large number of deer. However, in recent years, the number of deer has been greatly reduced by poaching.

Management work on this area consists of repair and maintenance of the deer-proof fence, clearing and planting a 10-acre plot to supplemental deer food, and control burning.

Deer—Although the rate of reproduction has apparently been normal on this area, the deer population has not had the expected increase. This may be due to excessive poaching.

Two food plots totalling approximately 18 acres have been planted to supplemental deer foods.

The eight-foot fence surrounding this area was severely damaged on two occasions by floods. This necessitated considerable repair.

In addition to this, approximately 15 miles of jeep trails and 10 bridges were maintained.

A combination overnight cabin and equipment shed was constructed on this area.

Deer Trapping

Clyde E. Harrison, Rowland P. Vernon, *Game Technicians*

Trapping Aids, Project 23-D Personnel

Deer trapping was another important phase of Project 23-D. This work was carried out on private lands in Madison, Tensas and Cameron parishes, through an agreement between landowners and the Louisiana Wild Life and Fisheries Commission.

In Madison and Tensas parishes, does were taken and bucks were eartagged and released at the trap site. In Cameron parish bucks were taken and does were released at the trap site. The deer taken were used for restocking depleted deer range throughout the state.

The deer trapping in Madison parish was carried out on lands belonging to J. W. McLemore, J. B. Hammond, John Olvey, the Foster Hunting Club and the Chicago Mill Lumber Company. In Tensas parish the trapping operation was confined to the Oceola plantation. These areas contain rich soils (Mississippi flood plains) with characteristic bottomland hardwoods. The land is poorly drained, consequently only the higher ridges are farmed. Thick stands of second-growth hardwood and underbrush surround the cultivated fields and pastures. This constitutes excellent deer range with a high carrying capacity.

It is estimated, by game technicians, that the deer populations wintering on this area averages one deer to six acres. This exceeds the normal carrying capacity of this type range; therefore, the deer are forced to depend on winter cover crops, such as Austrian winter peas, vetches and oats, for their winter forage.

The deer usually spend the day in the wooded areas, coming out into the fields to feed in the late afternoon, night, and early morning. However, it is not uncommon to see deer feeding in the fields at noon. In one instance, the project leader made a random count and estimated a total of 500 deer along a one and one-fourth mile field edge, in the late afternoon. It is along the edges of such fields that the trap sites are located.

To facilitate the trapping operation, a number of small plots, five to 15 acres, were cleared, plowed, and planted to cover crops. Approximately 140 acres have been treated in this manner. These food plots were used as locations for trap sites.

During February and March of 1952, 44 deer traps were used. A total of 72 deer was taken in 474 trap-nights. Forty of the total deer caught were does. (See Chart No. II.

During the 1953 trapping season, a total of 105 deer traps was used. A total of 255 deer was taken in 1601 trap-nights. One hundred and fifty of these were does. (See Table No. III.)

(For information of the places of release, see Tables Nos. II and IV.)

The trapping operation in Cameron parish was conducted on a 6 acre enclosure belonging to Rucie Moore. This enclosure contained 41 deer in 1952. All 41 of these deer were trapped within a period of seven days. Twenty of these were bucks and 21 were does. Nine bucks were released in Red River parish, 8 were released in Beauregard parish, two were released at the trap site and one died while handling.

During the 1953 trapping season, Mr. Moore again consented to give the state the bucks from this six-acre enclosure. Six bucks were trapped and released in Sabine parish during December, 1953.

TABLE No. II.

DEER TRAPPING RESULTS — 1952

Date	No. Traps Set	No. Adult Deer		Yearling Deer		Buck Re-Traps		Total Trapped	Total Released	Release Area
		Bucks	Does	Bucks	Does	Adults	Yearling			
February 8	30	1	2	2	4	0	0	9	6	Jackson-Bienville G. M. A.
February 12	33	1	1	2	4	0	1	9	5	Jackson-Bienville G. M. A.
February 14	35	1	4	2	0	1	1	9	4	Jackson-Bienville G. M. A.
February 15	37	0	2	2	1	0	0	5	3	Jackson-Bienville G. M. A.
February 20	39	0	7	1	0	1	2	11	7*	Jackson-Bienville G. M. A.
February 22	43	1	2	0	2	0	0	5	4	Jackson-Bienville G. M. A.
February 26	44	0	4	4	3	0	1	12	7	Jackson-Bienville G. M. A.
February 29	43	0	2	0	0	1	0	3	2	Jackson-Bienville G. M. A.
March 4	34	0	0	3	0	0	0	3	0	Jackson-Bienville G. M. A.
March 5	34	0	0	0	0	0	1	1	0	Jackson-Bienville G. M. A.
March 6	34	0	0	0	0	0	2	2	0	Jackson-Bienville G. M. A.
March 7	34	0	1	0	0	0	0	1	1	Caldwell Parish
March 12	34	0	1	0	0	0	1	2	1	Caldwell Parish
Total	474	4	26	16	14	3	9	72	40	

* One doe died while being transported to release area.

TABLE No. III.

DEER TRAPPING DATA — JANUARY 10, 1953 TO FEBRUARY 25, 1953

Date	No. Traps Set	Total Deer Catch	Retrap	Adults		Yearlings		Fawns	
				Male	Female	Male	Female	Male	Female
1/10/53	29	8	0	0	3	1	2	1	1
1/11/53	30	6	0	0	3	1	1	0	1
1/13/53	31	14	2	0	4	3	3	1	3
1/14/53	31	4	1	0	1	1	2	0	0
1/15/53	29	10	0	0	2	1	2	1	4
1/16/53	27	6	1	0	3	1	1	0	1
1/17/53	29	10	1	0	3	1	0	3	3
1/18/53	29	9	1	0	5	3	0	0	1
1/19/53	29	12	1	0	6	1	2	2	1
1/20/53	29	8	1	1	4	1	0	1	1
1/21/53	22	11	0	0	1	3	0	3	4
1/23/53	32	13	2	2	4	3	1	1	2
1/24/53	34	10	4	0	0	2	0	2	6
1/25/53	31	6	2	1	2	2	0	0	1
1/27/53	34	7	1	0	3	0	0	1	3
1/28/53	58	5	0	0	1	0	0	0	4
1/29/53	34	8	0	0	0	0	0	2	6
1/30/53	24	4	1	0	0	1	1	1	1
1/31/53	30	3	2	0	1	2	0	0	0
2/1/53	34	8	2	0	2	2	0	3	1
2/2/53	35	7	0	0	3	1	2	0	1
2/3/53	29	8	1	1	2	1	1	2	1
2/4/53	27	5	2	1	1	1	0	1	1
2/5/35	35	7	1	0	2	1	2	2	0
2/6/53	31	7	2	0	1	1	1	1	3
2/7/53	55	13	4	0	6	4	2	1	0
2/10/53	35	3	1	0	1	0	0	1	1
2/11/53	35	2	1	0	0	1	0	1	0
2/12/53	62	6	3	0	1	2	0	1	2
2/13/53	99	8	2	0	3	1	2	2	0
2/14/53	105	4	1	0	1	0	0	2	1
2/17/53	71	3	0	0	2	0	0	0	1
2/18/53	101	14	2	2	6	1	0	1	4
2/19/53	99	0	0	0	0	0	0	0	0
2/20/53	82	4	1	0	2	1	0	0	1
2/21/53	44	1	1	0	0	1	0	0	0
2/24/53	15	0	0	0	0	0	0	0	0
2/25/53	15	1	0	0	0	0	0	1	0
TOTALS	1601	255	44	8	79	45	25	38	60

TABLE No. IV

DEER RELEASED

(From Louisiana Trapping Program — 1953)

Date	Release Area	No. Released		Physical Cond.
		Bucks	Does	
1-10-53	Union Ph.	0	6	Good
1-11-53	Union Ph.	0	5	Good
1-13-53	Union Ph.	0	10	Good
Total			21	
1-14-53	Red River Ph.	0	3	Good
1-15-53	Red River Ph.	0	8	Good
1-16-53	Red River Ph.	0	5	Good
1-17-53	Red River Ph.	0	6	Good
Total			22	
1-23-53	Natchitoches Ph.	0	7	Good
1-24-53	Natchitoches Ph.	0	6	Good
1-25-53	Natchitoches Ph.	0	3	Good
1-27-53	Natchitoches Ph.	0	6	Good
Total			22	
1-28-53	Winn Ph.	0	5	Good
1-29-53	Winn Ph.	0	5	Good
1-30-53	Winn Ph.	0	2	Good
2-1-53	Winn Ph.	0	4	Good
2-2-53	Winn Ph.	0	6	Good
Total			22	
1-18-53	Caldwell Ph.	0	6	Good
1-19-53	Caldwell Ph.	0	9	Good
1-20-53	Caldwell Ph.	0	5	Good
1-21-53	Caldwell Ph.	1	5	Good
2-10-53	Caldwell Ph.	0	2	Good
Total		1	27	
2-3-53	La Salle Ph.	0	4	Good
2-4-53	La Salle Ph.	0	2	Good
2-5-53	La Salle Ph.	0	4	Good
2-6-53	La Salle Ph.	0	5	Good
2-7-53	La Salle Ph.	0	8	Good
Total			23	
2-12-53	Morehouse Ph.	0	3	Good
2-13-53	Morehouse Ph.	0	5	Good
2-14-53	Morehouse Ph.	0	1	Good
2-17-53	Morehouse Ph.	0	3	Good
2-18-53	Morehouse Ph.	0	10	Good
2-20-53	Morehouse Ph.	0	1	Good
Total			23	
Grand Total		1	160	One Died

Restocking with Out of State Deer

During the two-year period covered by this report, a total of 160 wild trapped deer was purchased from game farms in Wisconsin and released in the State of Louisiana. (See Table No. V.)

Sixty of these deer were released on game management areas and the remaining 100 on areas closed to deer hunting for a period of five years.

TABLE No. V

DEER PURCHASED FROM WISCONSIN AND RELEASED IN LOUISIANA[1]

Date	Release Area	No. Released		Physical Cond.
		Bucks	Does	
2-12-52	Grant-Rapides	13	19	Good
3-19-52	Grant-Rapides	1	7	Good
3-19-52	Sabine	3	17	Good
10-20-52	Caldwell	10	9	Good
1-1-53	Caldwell	3	3	Good
11-26-52	Union	7	8	Good
3-2-53	La Salle	8	5	Good
3-2-53	Winn	8	5	Good
2-4-53	Red River	2	13	Good
2-4-53	Natchitoches	6	8	Good
Grand Total		61	94	

[1] Five died enroute to Louisiana.

Summary

A summary of work done on Project 23-D, during 1952-1953, is as follows:

1. A total of 160 deer was purchased out of state for restocking purposes.

2. A total of 216 native Louisiana deer was trapped and released on Federal approved areas.

3. A total of 473 game farm turkeys was purchased and released on game management areas.

4. A total of 1,207 hogs was removed from fenced game management areas.

5. Efforts to control predators resulted in the trapping of 53 bobcat, 586 fox, 315 raccoon, 257 opossum, 91 skunks, 20 dogs, and six housecats.

6. A total of 253 squirrels was trapped, ear tagged and released on game management areas in cooperation with the state-wide squirrel study. A total of 186 squirrels was purchased from out of state game farms and released on the game management areas.

7. Approximately 250 acres were planted to supplemental deer food.

8. A total of 190 acres was planted to supplemental turkey food.

9. Approximately 60 miles of roads and jeep trails were constructed and maintained.

10. Thirty-five small bridges were constructed and approximately 110 were maintained.

11. A total of 17.4 acres was planted for quail habitat improvement.

12. A total of 5,540 acres was control burned to improve game range.

13. The boundary line around each of the eleven game management areas was cleared of brush to a width of six feet, line trees repainted, and signs replaced whenever necessary.

14. Salt licks for the benefit of deer were maintained on all of the game management areas.

15. Five small ponds were constructed for game watering purposes.

16. Nine overnight cabins were constructed on the game management areas, one of which was destroyed by vandals.

17. One hundred and thirty-four acres of land was cleared for game habitat improvement, using the D-6 Caterpillar.

18. All buildings, equipment, fences, roads. bridges, and water gates were maintained in good condition.

19. Public relations were good in the vicinity of the game management areas, as only a very few instances of poaching or vandalism were reported.

John Campbell, Carrol Perkins, and George Moore confer with Fish and Wildlife Service personnel from the Atlanta office regarding the federal aid program. —*Photo by Coogan.*

FEDERAL AID IN FISH RESTORATION

(Dingell-Johnson)

Coordination

Coordinator: Lyle S. St. Amant

Project F-1-R, Fish Population Investigations

Co-leader: Victor Lambou
Co-leader: James A. DeJean*

Project F-2-D, Water Hyacinth Control

Supervisor: J. G. Dutton

Federal Aid in Fish Restoration
Dingell-Johnson

Lyle S. St. Amant, *Coordinator*

In March, 1953, a new section of Federal-Aid dealing with fish was initiated in Louisiana. Like the Federal-Aid to wildlife restoration (Pittman-Robertson), the Federal-Aid to fish (Dingell-Johnson) is based on federal legislation which earmarks fishing tackle tax monies for fish restoration. The state of Louisiana matches the federal funds at the rate of 25 cents on the dollar. The work carried out with such fund falls into four categories, i.e., research, development, maintenance and coordination. In most cases a specific job or a group of jobs is set up into projects by a specific contract form. Supervision is both by state and federal personnel.

The amount of money which Louisiana receives annually for such work is based on a ratio of the state's area, its volume of license sales, and, of course, the total amount of tax monies collected.

At present, because the program has just become initiated in the United States and because Louisiana only sells licenses to rod and reel fishermen—our annual allotment is comparatively low. It is now averaging about $50,000 annually but is expected to increase next year coincident with an increase in license sales. **Louisiana, however, will never receive its full share of Dingell-Johnson funds until our fishing license sale is extended to all types of fishermen.**

Two projects are now being operated under this new program. One of these is a research project aimed at inventorying the fishery resources of the state, typing and studying the productivity of the state's waters and determining the fishery problems of the state. The other project involves the operation of two water hyacinth control crews. Projects planned for the future will deal with fish population sampling procedures, pollution problems, stream and lake improvement, and fish growth and reproduction. As many of them as possible will be set up in July 1954.

Following is a brief summary of the work done to date.

Project F-1-R
Fish Population Investigation
Dingell-Johnson

On April 1, 1953, Dingell-Johnson Project F-1-R (Fish Population Investigation) was initiated, in order to gather the basic information needed to plan a constructive sport fish management program. The information which is needed to evaluate a management program is as follows:

1. The importance, use and extent of the various ecological types and subtypes of waters occurring in Louisiana.
2. The fish population composition in selected aquatic types.
3. The growth rates of important game fish.
4. The success of reproduction of important game fish.
5. A comparison of population composition, growth rates and reproduction in various waters, and the factors controlling them.

In order to supply this information, this project is divided into 6 parts. A discussion of these parts, how their objectives will be accomplished, and what has been accomplished so far follows:

Classification of Louisiana Waters

In order to initiate this investigation on a systematic basis, Louisiana waters were classified according to general ecological types. This classification is based mainly upon the general physical characters of the different bodies of water. So far, all of the waters in this state have not been classified, and it is possible that some do not fit into this classification. However, it is felt that the majority of the waters and surely those which are of importance for public fishing will fit into this classification. The various classes of water are as follows:

Streams

Class 1. Large meandering rivers with extensive flood plains. Examples: Red, Mississippi and Atchafalaya Rivers.

Class 2. Streams located in the region of the Arkansas Alluvial Cone. Examples: Boeuf, Tensas and Black Rivers.

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* Resigned December, 1953.

Class 3. Streams of the coastal terraces without extensive flood plains. Examples: Six Mile, Whiskey Chitto and Comite Rivers.

Class 4. Streams of the coastal terraces with flood plains. Examples: Pearl and Sabine Rivers.

Class 5. Streams of deltaic plains. Examples: Lower reaches of Calcasieu, Tickfaw and Tangipahoa Rivers.

Class 6. Streams flowing through alluvial plains. Example: Bayou Cocodrie.

Class 7. Streams flowing through tertiary deposits. Examples: Bayou Castor, Dorcheat Bayou and Dugdemona River.

Backwater

Class 1. Red River backwater area. Examples: Grand, Sunk and Lac aux Siene Lakes.

Class 2. Atachafalaya backwater area. Example: Little Alabama Bayou.

Class 3. All other backwater. Examples: Colyell Bay and Blood River.

Lakes

Class 1. Impoundments. Examples: Wallace, Black, Bistineau and Anacoco Lakes.

Class 2. Lakes of deltaic plains. Examples: Penchant and Sweet Lakes.

Class 3. (a) Oxbow lakes which overflow. Example: Old River. (b) Oxbow lakes which don't overflow. Examples: False River, Lake Providence and Clear Lake.

Class 4. Miscellaneous lakes. Examples: Bayou DeSiard, Morganza Pits and City Park Lake.

Class 5. Small impoundments. Example: Farm Ponds.

It is necessary to know the importance, use and extent of each type of water. This information is needed in order to know how much effort and money should be allocated to the various waters. The amounts of each type and subtype will be tabulated from existing maps. The results of an intended survey of public fishing camps occurring in the state should serve as a rough index to the importance of each type. Creel censuses will be conducted on various selected waters. These will furnish valuable information on the use of the various waters, and will also show to what extent the available aquatic crops are being harvested.

Fish Population Composition

One of the basic essentials for an intelligent fish management program is intimate knowledge concerning the amount, kinds and sizes of fish present in the waters to be managed.

Research has shown that a given area of water will produce and maintain a certain poundage of fish and no more. Once the maximum carrying capacity is reached, the poundage does not increase with time but remains the same.

In many cases, the presence of one kind of fish will reduce the amount of other kinds of fish in the same lake by competing for food. Sufficient food is present to support only a limited amount of fish, and if the two kinds of fish eat the same type of food, the abundance of one is held in check by the presence of the other. Quite often a competing species is an undesirable fish, e.g., one that is not highly prized as a game fish, or has no economic value such as for food. It is obvious that the removal of one species should permit an increase in the quantity of the other. This has proved to be the case in actual management practice with various species of fish.

A similar selective removal of fish is constantly occurring in our waters. Most fishermen seek the desirable fish while the undesirable fish are left in the water to multiply. The result is an unbalanced ratio of fishes and poor fishing. Many of the so-called "fished out" lakes and streams are actually supporting a maximum poundage of fish—but of the wrong kind.

In order to determine the composition of a fish population, this survey employs a sampling technique which indicates the condition of an entire lake or stream. Representative areas are selected within the lake or stream to be sampled; and a chemical, which causes the fish to rise to the surface and die of asphyxiation, is applied to the water. In this manner the biologist gathers all of the fish from small areas and obtains information concerning the fish population of the entire lake or stream.

Determination of Age and Growth

Knowledge of the age and rate of growth of fish is helpful in regulating fishing seasons, size limits, creel limits and in evaluating various management practices.

The method being used in determining the age and growth of important game species on this project is the scale method. An annulus or ring is formed on the scales of fish after each annual growing season. Each of these rings represent one year of growth and they are difficult to see without the aid of a lens.

The distance between these rings indicate the rate of growth for that particular year; and it is possible to calculate the rate of growth for previous years, by comparing the distance between rings with the length of the fish.

Scales are taken from fish collected during the population composition sampling, and it is expected that this information will be of immense value to the fish management program.

Success of Natural Reproduction

Most species of fish possess a rather large reproduction potential when compared with other vertebrates. If one examines the numbers of eggs in most female fish, it is indeed a wonder that our waters are not overflowing with fish. However, there are many factors which determine the fate of a fish from the egg to the adult.

It is the purpose of this part of the fish management program to determine the degree of success of natural reproduction of important game species, and if possible, to study the factors affecting it. The spawning season is determined by periodically examining both male and female fish for the presence or absence of milt or eggs. It is hoped that such factors as temperature, siltation, overflows and population composition might be correlated with the spawning season and survival of the eggs and young fish. Minnow seines and small mesh bait trawls are used as a final check on the survival of the young fish.

Clear Lake Investigation

Clear Lake, which is a small oxbow lake that does not overflow, was selected as a study area, in order to gather information on how to manage this lake and other similar bodies of water for sport fishing. There are many similar lakes in the state, most of which are accessible to the sportsmen and support a large amount of sport fishing.

Previous work revealed that Clear Lake was supporting approximately 600 pounds of fish per acre. However, 90 per cent of this weight was gizzard shad and only seven per cent was game fish. It is felt that the balance of fish composition of Clear Lake is not ideal, from a sport fishing management standpoint. The results of a creel census on Clear Lake showed that only 1.08 fish was being caught per man hour of effort, which is considered a low success.

An attempt will be made to change the fish composition of Clear Lake from its present composition to one which is more favorable from a sport fish management standpoint. Gizzard shad and rough fish will be removed from the lake by seining, until they make up a small per cent of the total population. The fish composition, fish production, growth rates of game fish and reproduction success of game fish will be determined at various intervals, so as to ascertain how they are being affected by the removal of gizzard shad and rough fish. A creel census will be conducted in order to measure the effects of the seining operations upon fishing pressure and success.

The results of this investigation should help determine the value of seining as a fish management tool in Louisiana. The cost of this operation in money, manpower, and time will be computed in an effort to determine whether or not the effort expended is worth the increase in game fish production and harvest. This should serve as a guide to determine the feasibility of managing other similar waters with similar problems in Louisiana.

Analysis of Data—Recommendations for Management and Reports

This part consists of analyzing and correlating the data collected by the previous parts. Information obtained from this phase will serve as a basis for recommendations for planning a constructive sport fish management program and will point the way for future Dingell-Johnson investigation and development projects. The recommendations and results of work performed will be submitted to the Louisiana Wild Life and Fisheries Commission in the form of progress reports, whenever sufficient reports have been submitted, the first describing the results of work performed on Clear Lake and the second describing the results of work performed on the Little River drainage system.

Project F-2-D

Water Hyacinth Control

A portion of the federal-aid monies for fish restoration is being applied to the control of noxious water plants, primarily water hyacinths and alligator weeds. Since a permanent weed control section exists in the department, it was deemed more economical to aid that project already established rather than set up a dual operation. Therefore two complete spraying crews, each consisting of two men, a barge, spray pumps, chemicals, and motors were placed under J. G. Dutton, supervisor of water weed control. The results of the work done by the crews is reported under the Water Hyacinth Control Section elsewhere in this report.

Predator Control

T. E. Harris, *Predator Control Supervisor*

Predator control in Louisiana had its beginning on July 1, 1947 when Joe Miller, Leesville, was appointed to supervise this program.

On August 1, 1947, T. E. Harris was employed as trapper to work under Mr. Miller's supervision.

Much of the first work was trapping wolves whose increase had been unchecked for years.

As time passed the program was expanded until 14 trappers were working under Mr. Miller's supervision. At the time of Mr. Miller's death on May 15, 1952, nine trappers were active in the trapping program.

On May 16, 1952 T. E. Harris was appointed supervisor with the following trappers under his supervision: H. R. Blount, Ferriday; H. Elliott, Oakdale; W. W. Maddox, Oakdale; Jessie Meyers, Merryville; L. D. Skains, Winnfield; Frank Turner, Fitkin; A. Vaussine, Sulphur; Roy Lauzervich, Maurepas.

By June 15, 1953, personnel in the predator control section had been reduced to the following men: T. E. Harris, W. W. Maddox, H. R. Blount, and Allen L. Hawsey who was employed February 1, 1953. Mr. Blount was transferred to the Pittman-Robertson section on August 1, 1953 to trap beavers for distribution in suitable places over the state.

Much of the predator control effort since May 1952 has been in reducing the bobcat and fox population in the Game Management areas. With Mr. Hawsey trapping 50 bobcats in Singer Refuge of Madison Parish from March 1953 to December 1953.

During the fiscal year July 1, 1952 to June 30, 1953 the following predators were trapped: Skunks, 792; wolves, 14; armadillos, 970; foxes, 1,305; bobcats, 167; miscellaneous, 2,145 for a total of 5,393.

Until June 1953 the beavers were trapped and transplanted by personnel of the predator control sec-

A trapper sets this trap for beaver in the Amite country.

tion. At the time of this writing, December 1953, only two men are active in predator control.

From reports from Madison and Tensas parishes where wild turkeys are most abundant, the wildlife rangers and sportsmen report a good increase in turkey populations since the bobcats have been reduced in number.

Much of our work benefits the stock and poultry raisers as pigs, young calves, goats, sheep and poultry are choice foods for predator animals.

During outbreaks of rabies among foxes in Caddo and Red River parishes in 1952 the predator control unit worked to reduce the fox population in affected areas.

The predator control unit is to assist in the deer trapping program at the close of the hunting season.

Foxes are the most numerous predators and are found in all areas of the state with the greatest number in the hill sections.

Raccoons are becoming a major nuisance with their damage to eggs of all birds including turkeys, wood ducks, etc. They are also destructive to young squirrels.

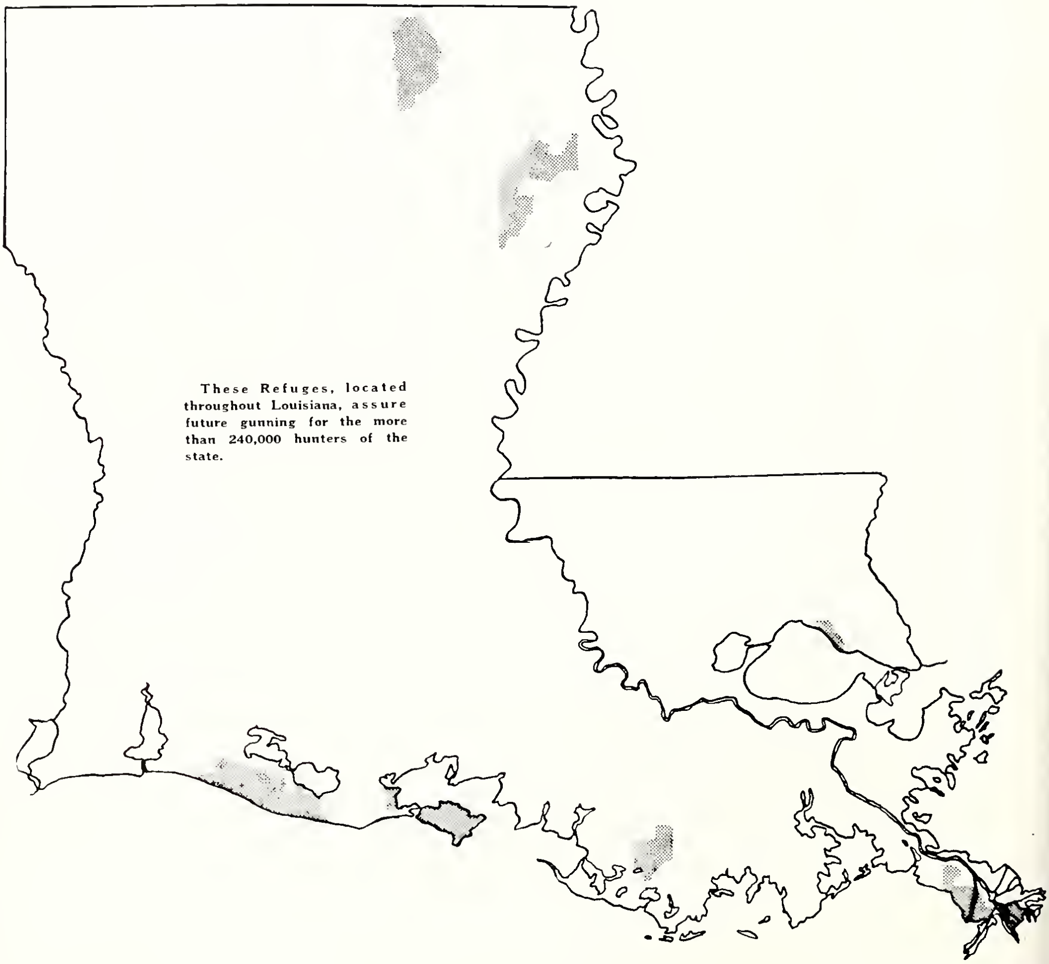
Bobcats are widely scattered over the state and are destructive to young fawns, turkeys, squirrels and rabbits.

Wolves are not numerous since their number has been reduced until their damage is negligible except their damage to calves in DeSoto parish. Skunks are numerous with the greatest numbers found in swampy areas, their only damage of any consequence being to eggs of ground nesting birds.

Tracks and other signs of a puma were found in Red Rirt Game Refuge in south Natchitoches parish in June 1949 and efforts were made to trap this animal, but were not successful.

With the number of predators kept in balance and the restocking of deer, etc., and improved habitat over the state, hunting and fishing should be one of our major recreations for generations to come.

Trapper Allen J. Hawsey holds "one of a hundred"—bobcats trapped by him in eight months during 1953, most of them taken from Madison parish.



These Refuges, located throughout Louisiana, assure future gunning for the more than 240,000 hunters of the state.

Division of

Fur and Refuge

Ted O'Neil, Chief

. . . work being done.

The Fur and Refuge Division is set up primarily to carry out the obligations promulgated in the Acts of Donation of the Wild Life Refuges to the State of Louisiana and to assist in the protection, management and redevelopment of what was once a fur industry worth $15,000,000 annually and employing 20,000 persons to what is now a three million dollar industry employing less than six thousand persons.

A long range six-year expansion and development program has been planned and authorized by the Commission. This development and expansion program is being financed by revenues derived from natural resources produced on the refuges, which is in accordance with the Acts of Donation.

The best known biological principles are being employed in developing the wildlife habitat found on the refuges. We have on hand ample knowledge from past studies and experience to proceed with this marsh development program; however, the ecological changes resulting from physical changes that will be brought about by this work are being followed by the division's biologists and graduate wildlife students since there is much to be learned.

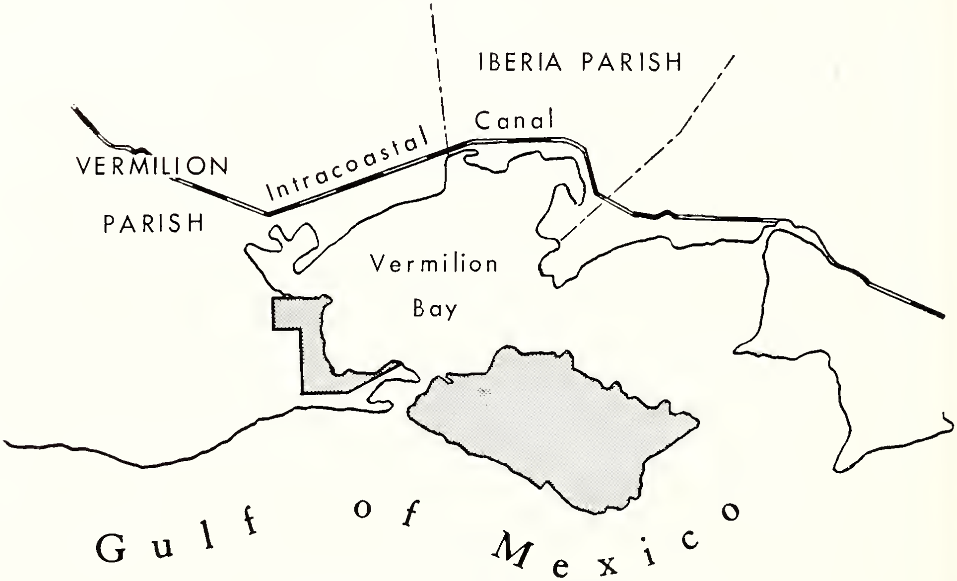
A well rounded research program has been outlined and put into effect, keeping in mind the practical aspect of waterfowl, furbearers and shorebird management. Commercialization all along the Gulf Coast and the changing flow of the Mississippi River and its bed load has opened enormous fields for research. Just think of the unprecedented possibilities in studying the inevitable saltwater encroachment throughout the present delta, due to a retarded river flow, and the study of the new delta that is being formed in the Morgan City area. There will be opportunities to study the rapid erosion of the old delta and its adjacent sub-deltas and accretion of the new delta, which is the very foundation of the rich wildlife habitats of all southeast Louisiana. The new delta will form near the mainland and not be extended to an unnatural position far out into the Gulf of Mexico as a result of man made levees.

Just think of the possibilities which will be presented in studying the ecological changes resulting from the work planned and well underway on the Rockefeller Refuge. Here in this 86,000 acres of prairie-type marsh located in southwest Louisiana, we will have absolute control over water levels and salinities on 80 per cent of the entire area. Management and studies of this magnitude would have never been possible without the monies from oil operations and the foresight of men like E. A. McIlhenny, the Rockefeller and Russell-Sage attorneys and officials, when drawing up the original deeds of donation of these refuges to the State of Louisiana.

It takes many years to study a "peak to trough" cycle of the various phenomena that occur in the coastal marshes. For instance, who would have predicted three consecutive years of severe drought conditions, each more severe than the preceding one, all following a prolonged wet cycle? In coping with this extended wet cycle, tremendous drainage and flood control projects came into existence. These, coupled with the accelerated agricultural and industrial development also making further drainage demands, adversely affected thousands of acres of marshland, the extent of which was not noted until the drought years became evident.

Who would have predicted that the fur buyers of 1954 would be measuring pelts with a yardstick instead of grading fur in the usual manner? Reference is made to the exotic nutria, now the most important fur producer in Iberia, Vermilion and Cameron parishes. This does not necessarily mean a great deal since the nutria have recently dominated this area, presenting a new problem of managing marshes that are host to countless nutria, an animal that weighs from 18 to 20 pounds and eats one-third of his weight in grass, roots and stalks daily.

State Wildlife and Marsh Island Refuges



Forming the southern and western boundaries of Vermilion Bay, are two refuges centered in the state's greatest concentration of Blue Geese and Nutria. State Wildlife, donated in 1911 by Ward-McIlhenny, contains 13,000 acres. Marsh Island, covering 79,000 acres, was donated by the Russell Sage Foundation in 1920. The original deed of donation prohibited all oil activities on Marsh Island; however, it was mutually agreed to by both parties to allow leases to be let and revenues therefrom to be equally divided between Russell Sage Foundation and the State of Louisiana, with the provisions shown in Act 47 of 1944. However, by the end of 1952, such funds were exhausted and the island is now maintained by the Fur and Refuge Division under the Fur and Refuge Fund.

MARSH ISLAND

Work Done

Repaired 25 trappers' camps.

Rebuilt one camp.

Reequipped Headquarter's Camp on Bird Island.

Installed hotwater heater, lavatory, new stove in headquarter's camp.

Purchased three shallow-draft patrol boats and one Joe-boat with air-cooled engine.

Repaired the boat Marshland and replaced engine with new 216 hp Diesel GM.

Installed 550-gallon capacity gas tank at Bird Island camp.

Opened patrol ditch between Lake Lucien and Oyster Lake.

—Work Done

Purchased aluminum barge for heavy transportation.

Carried out burning program that was successful in producing thousands of acres of three-cornered grass which replaced wire grass roughs.

This year's burning was to attract geese. Recent goose surveys showed 200,000 blues and snows on Marsh Island.

Detailed study was carried out on effect of oil exploration on island by marsh buggies.

Refuge personnel, during routine patrol, are locating most suitable sites for installation of low-level dams or sills which will prevent hundreds

MARSH ISLAND—Continued

Vork Done

of ponds on the island from going dry during extremely low tides. These tide fluctuations are limiting factor for growth of aquatic waterfowl food plants.

close check was kept on the number of cattle grazed on Marsh Island and the number of cattle that were brought to and taken off the Island.

leld a public meeting of state's most experienced trappers to demonstrate the several successful methods of skinning and stretching nutria pelts.

hrough careful cleaning and use of identical molds, established a program of uniform handling of nutria furs.

hrough new platoon system of wardens, have established a 24-hour patrol on Marsh Island.

larsh Island now in radio communication with Louisiana State Police and sheriff's office.

wenty-two trappers to remove surplus nutria.

lade extensive game and fur animal survey and also vegetative survey of Island.

orrected boundaries and had new maps made.

Vork To Be Done

onstruction of the following has previously been approved by U. S. Fish and Wildlife Service, Russell Sage Foundation and Department of Public Works.

onstruct reservoir in Cheniere LaCroix area, seven square miles, for purpose of creating waterfowl and freshwater fish habitat.

onstruct 35 water-control sills in bayous which will improve much of the excessively drained higher marshes, preventing tide fluctuations and bring about change from valueless vegetative species to three-cornered grass, and improve the ponds for water-fowl food planting.

Work To Be Done

Dig small dragline ditch leading from headquarters of Bayou Chene to beach at Cheniere LaCroix, origin of ditch to be inside beach impoundment levee in order to not cut into tide action at any point.

Plow mud-boat ditches, 20 miles, making all sections of island accessible for patrolling and proper trapping.

Construct headquarters camp, boat house and work shop at Bird Island Bayou and camp at Cheniere LaCroix for purpose of operating water control structures and sills and patrolling refuge properly.

Fur and Refuge Chief at state fur auction in Abbeville.

STATE WILD LIFE REFUGE

Vork Done

ll camps rebuilt with cypress lumber.

uilt two new camps.

eequipped headquarters camp and installed hot water heater.

uilt new work shop.

eplaced 32-volt light plant.

urchased cycle-type weed-cutter to clean around camps for fire prevention.

roperly posted refuge.

stablished 24-hour patrol on refuge.

roper burning of marsh for growth of three-cornered grass and to attract geese.

epaired and relocated following boats to State Wildlife: Beaver, Grand Cheniere, Fox and T-Joe.

urchased two new outboard motors.

Work Done

Made an extensive game, fur animal and vegetative survey of refuge.

Corrected boundaries and had new maps made.

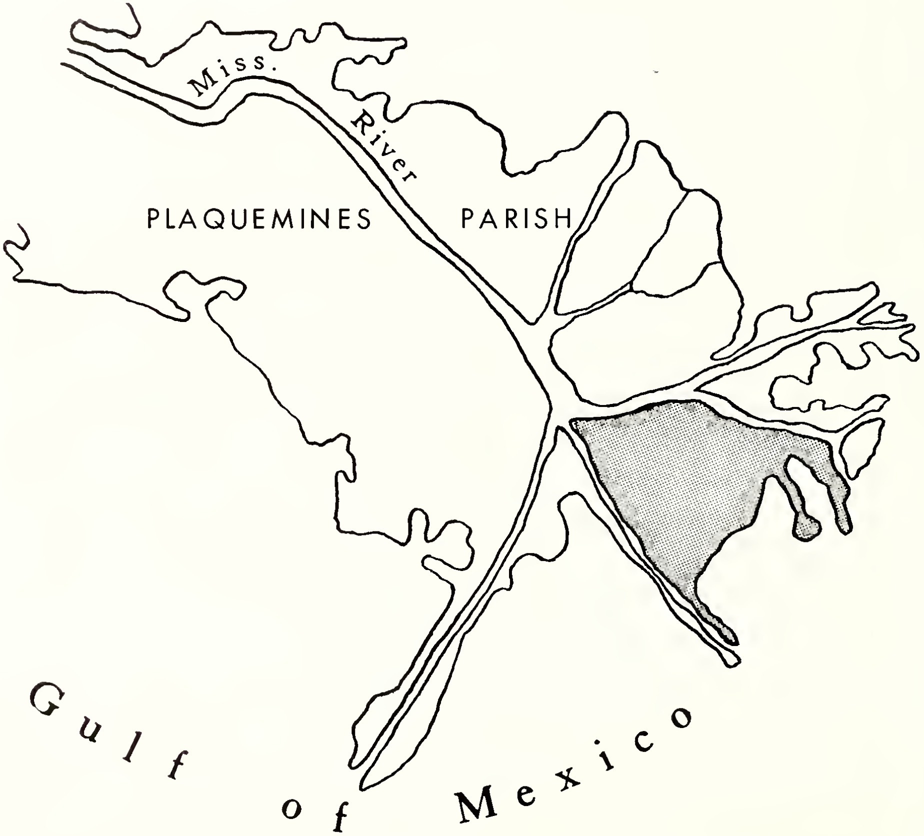
Work To Be Done

Construct three new camps on the refuge for purpose of trapping operations and better patrolling and aiding in operation of water-control structures.

Plow 10 miles of ditches throughout refuge, making refuge accessible for patrolling and proper trapping.

Construct 10 sills in bayous to prevent excessive drainage and tide fluctuations for purpose of encouraging growth of proper vegetation for waterfowl and furbearers.

Pass a Loutre Public Hunting Grounds



Pass a Loutre: 66,000 acres of accreted delta marsh lands obtained by Act of Legislature No. 52 in 1921. Besides being valuable as a public shooting area, this land is used as a haven by wintering waterfowl, white pelicans and otters. Oil wells and sulphur mines located on this land give financial aid because under Act 29 of 1936, all revenues derived from trapping leases or th sale of furs or mineral leases or exploitation in any wa of the mineral resources . . . are hereby dedicated . . for the protection, maintenance, operation and develop ment of such areas or for the acquisition of other suc areas.

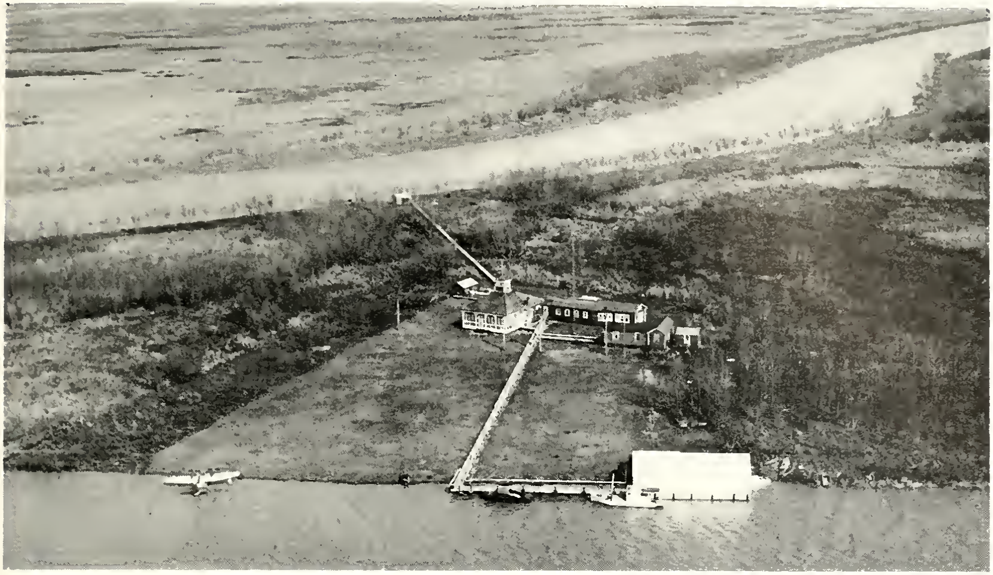
PASS-A-LOUTRE PUBLIC GROUNDS

Work Done

- Water hyacinth control; opened 1,000 acres of hunting ponds by spraying.
- Built two new cisterns.
- Raised and renovated headquarters camp.
- Purchased new ditching machine.

Work Done

- Corrected boundaries and had new maps made.
- Assisted in the now pending publication "Intro duction to the Birds of Louisiana" by Georg H. Lowery, Jr., Ph. D.



Headquarters camp at Pass-a-Loutre Public Shooting Grounds.

Vork To Be Done

nnual spraying of ponds by plane and spray boat to control water hyacinth and other undesirable vegetation.

ig ditches to make all ponds accessible to hunters.

onstant maintenance to headquarters camp and wharf.

One of several million nutria in the Louisiana marshes.

Work To Be Done

Purchase spraying barge.

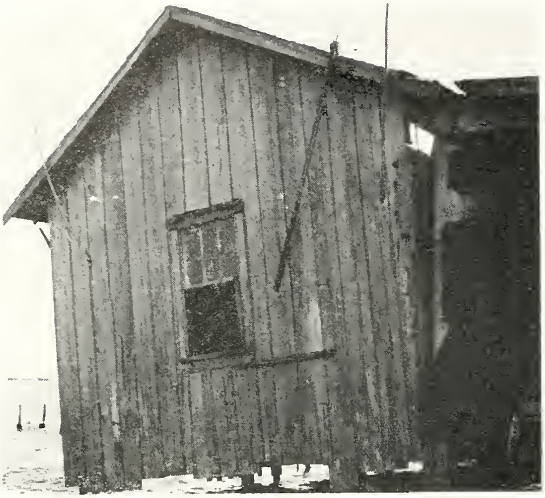
Waterfowl food planting; plant all suitable ponds and mudflats.

Wildlife education: Assist in the installing of waterfowl panorama exhibit in Museum of Natural Science, Louisiana State University. This will provide the largest exhibit of waterfowl in the United States and the legend and other explanatory material will attempt to cover the problems of waterfowl management, as well as facts relating to the life, history, migration, food habits, etc., of the species.

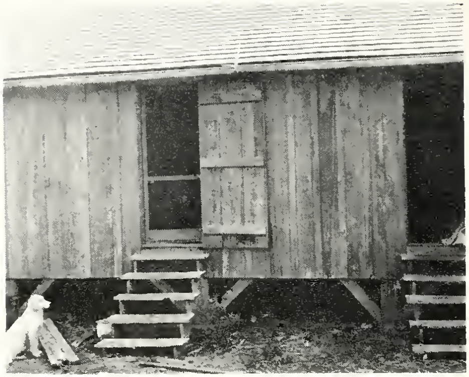
Construct water-control sills to prevent excessive drainage and salinity fluctuation in the important ponds on the Pass a Loutre Public Shooting Ground.

Resurvey the newly accreted lands and post and fence refuge where necessary.

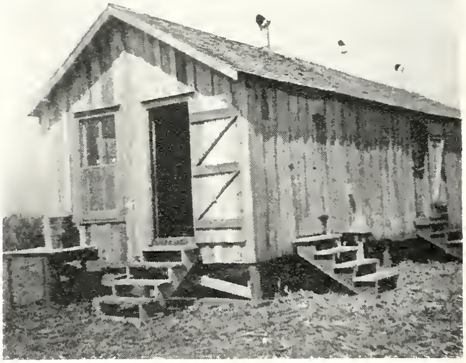
The MARSHLAND, attached to Marsh Island.



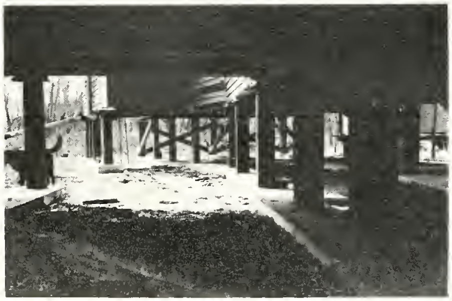
Typical condition of trappers' camps before work began on State Wildlife, Marsh Island and Rockefeller Refuges. This camp located on Marsh Island.



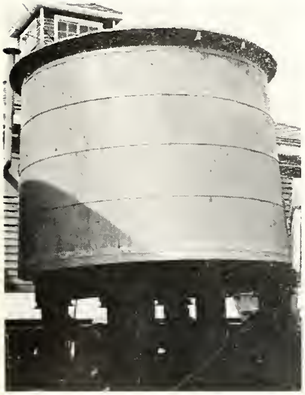
Top photo shows new roof on camp at Marsh Island. Roof made of cedar shingles. At bottom is one of the renovated trappers' camps on State Wildlife Refuge.



—(*Photos by Webert*)



View showing new pilings and foundation at headquarters' camp, Pass-a-Loutre.

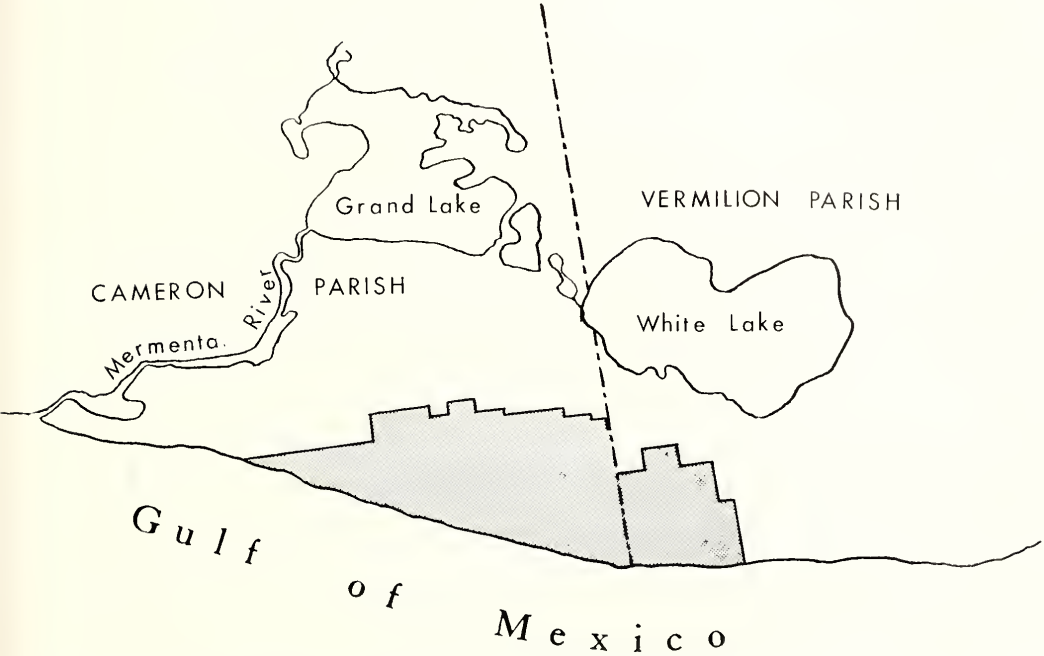


One of the two new cisterns at Pass-a-Loutre.

New workshop located on State Wildlife Refuge.

Main headquarters' camp, Pass-a-Loutr
process of being raised.

Rockefeller Refuge



One of the important wintering areas for blue geese and other migratory waterfowl and shore birds is contained within the boundaries of the 86,000-acre Rockefeller Refuge located in Cameron and Vermilion parishes. Donated to the state in 1920 by the Rockefeller Foundation . . .

"The revenues from such oil or minerals mined and developed shall be first used for . . . maintenance, policing and improvement of this wildlife refuge or reserve, and the development of conditions suitable for improving such wildlife refuge or reserve. Any surplus of revenues . . . shall be used for . . . the public schools of . . . Louisiana or for public health work within the State of Louisiana."

ROCKEFELLER REFUGE

Work Done

Reequipped both east and west end cottages.

Built boat house on Pecan Island.

Purchased four new mud-boats.

Surveyed all outside boundaries and posted every quarter mile with asbestos pipes and refuge signs.

Contracted Shutts & Sons, Civil Engineers, Lake Charles, Louisiana, to complete boundary surveys.

Employed surface geologist to give us complete study and correlation of surface geology and ecology on Rockefeller Refuge. Purchased necessary equipment for geological and ecological studies.

Purchased barges, draglines, marsh buggies, mats, pick-up truck and other necessary equipment to complete extensive refuge improvement project.

Work Done

Conducting studies on germination of three-cornered grass seeds.

Keeping monthly reports on salinity readings at different stations throughout the refuge.

Repaired and improved levee from headquarters camp to Gulf thereby stopping further salt water intrusion into the marshes.

Redredged and widened Joseph's Harbor leading into the refuge from the Gulf.

All spoil bank distribution and dredging work carried out by oil companies holding leases on the refuge have complied with plans set forth

Work Done

by the Fur and Refuge Division which will enhance the refuge value to wildlife and further our long-range development program on the refuge instead of being detrimental.

Repaired and equipped Vermilion headquarters camp and repaired all trappers' camps.

Purchased six pirogues for waterfowl food planting and other work in canals and reservoirs.

Purchased large twin-engined speed boat for patrolling along the refuge's gulf shore.

Made a complete fur animal and vegetative survey of refuge.

Proper burning attracted 200,000 blue and snow geese this season.

Data is being collected for a publication covering the life history of the furred animals of Louisiana.

Rented fur house in Abbeville for 1953-54 auction of state-owned furs.

Each refuge will bear its proportionate share of the expenses of erecting and maintaining permanent Fur Auction House in Abbeville, Louisiana, on a Vermilion River site previously purchased for this purpose.

Work To Be Done

Construct small dragline canal all along north boundary of the refuge. This canal will transect the Superior Oil Company canal at a point where it enters the Rockefeller Refuge.

Water control structures will be constructed on the east and west banks of the Superior Canal for purpose of obtaining a fresh water supply throughout the refuge at all times.

Construct approximately 15 reservoirs at suitable sites along the 20-mile lateral canal ranging from 100 to 600 acres each. Suitable water control structures for purpose of manipulating water levels to best advantage of waterfowl food plants and fresh water fish.

Repair existing levees and place water control structures or sills at strategic points along the levees and along bayous and ditches where excessive drainage and salt water intrusion are taking place.

Pirogues, boat house and workshop on Pass-a-Loutre.

Work To Be Done

Make a study and examine the possibility of placing large water control structures in each of the main bayous on the refuge at a point near the gulf beach. If this is found to be practical we will have complete control of water levels and salinities throughout the entire refuge.

Plant sods of three-cornered grass every 12 feet behind marsh buggy at two mile intervals from northern boundary to salt marshes on gulf.

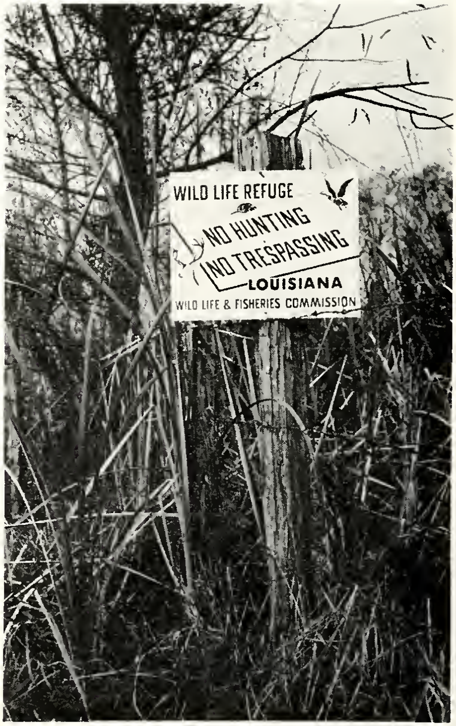
Plant all suitable ponds with duck food plants.

Repair all remaining camps on Cameron side of refuge.

Construct two modern boat sheds with shops for minor boat repairs and a boat ways large enough to raise large speed boats.

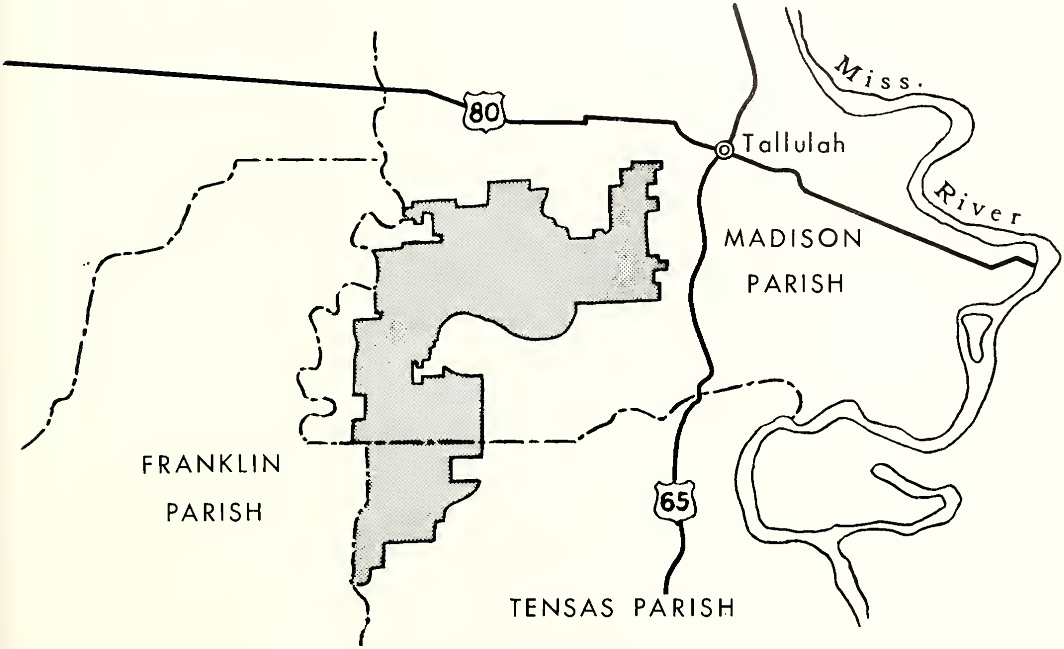
Construct proper bulk heads and fills at headquarters camp.

Dredge slip and construct shed to house heavy equipment.



New signs to be used on all lands posted by Fur and Refuge Division. Reflector signs to be used along all highways.

Chicago Mill and Lumber Co. Refuge and Ayer Timber Co. Inc. Refuge



The Chicago Mill and Lumber Company Wild Life Refuge covering 38,765 acres in Madison parish and the Ayer Timber Co., Inc. Wild Life Refuge are areas leased from the lumber company to the state and placed under supervision of the Wild Life and Fisheries Commission. The Ayer Timber Co. Inc. Refuge covers 19,000 acres in Tensas parish and 11,000 acres in Madison parish. These two refuges adjoin one another, totaling approximately 70,000 acres. This upland game area serves to protect the greatest deer herd in the South during the hunting season. Aside from deer, it also protects turkey and other small game.

CHICAGO MILL & LUMBER COMPANY (SINGER WILDLIFE REFUGE) AND AYER TIMBER COMPANY, INC. WILDLIFE REFUGE.

SINGER AND AYER PRESERVES

Work Done

Bought new jeep truck.

Posted, painted and bulldozed 140-mile road completely around boundary of both refuges.

Renewed lease on Ayer Refuge.

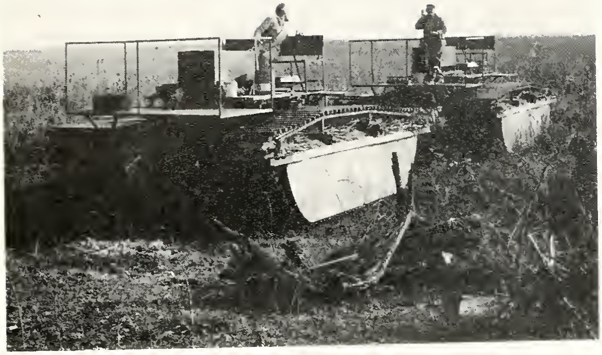
Purchased necessary boats and outboard motors for patrolling waterways on the refuges.

Corrected boundaries and had new maps made of refuge.

Work To Be Done

Plant oats and sesbania in the openings within the refuges.

Improve the sport fishing on the refuge by allowing commercial fishermen, under supervision of our wardens, to take the many pounds of rough fish from the lakes within the refuge, permitting the game fish to dominate the area.



(Top left) Two caterpillar type marsh buggies pu
chased for construction and rehabilitation work on Roc
feller Refuge.

Three-cornered grass-wire grass marsh grown over mar
buggy trail, Plot 1 exploration studies

←

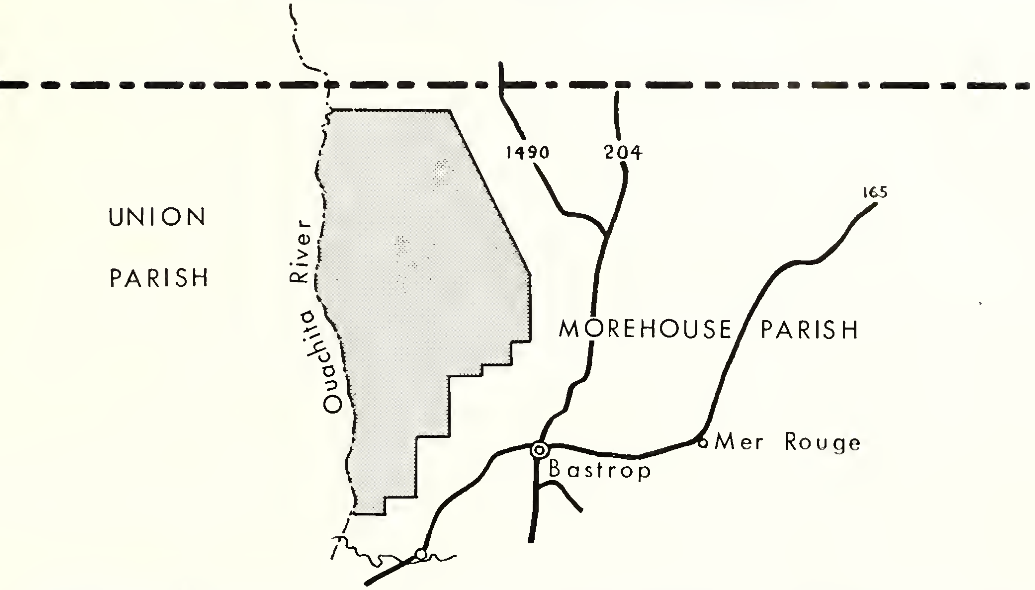
(Top right) Marsh buggy trail through three corner
grass and wire grass marsh, study Plot 1 established

—(Photos by Webert)

Ranger Capt. Jim Parker of Madison parish and Refuge Warden Jim Perritt with new jeep.

Bulldozed road running 140 miles along entire boundary of Singer and Ayer Refuges. No trespassing signs and painted trees make this boundary unmistakable.

Morehouse Game Refuge



The 43,000-acre Morehouse Game Preserve is an area eased from the Crossett Lumber Company to the state, which lease is renewable each 10-year period. This upland game area serves to protect deer and turkey and other small game.

Work Done

Painted and posted boundary lines.

Purchased necessary boating equipment for patrolling.

A marsh fire seen across Deep Lake on Rockefeller Refuge.

Work To Be Done

Permit commercial fishermen, under the supervision of our wardens, to take the rough fish from the refuge waters to increase production of game fish.

Extend boundaries to take in some ridge country adjacent to the bottom lands for the purpose of giving game added protection during flood periods.

Oysters taken from bayous on Rockefeller Refuge.

Marsh Island trapper with nutria skins on molds and fresh ones hanging fur side out to dry.

←

Hanging muskrat and nutria pelts to dry at State Wildlife Refuge.

→

Releasing healthy muskrats in three cornered marsh grass, free of both nutria and muskrats.

↓

↑

Collecting nutria pelts on Marsh Island for state auction in Abbeville.

Sacking nutria pelts. These will be transported by boat from Marsh Island to fur auction house to be sold by sealed bids.

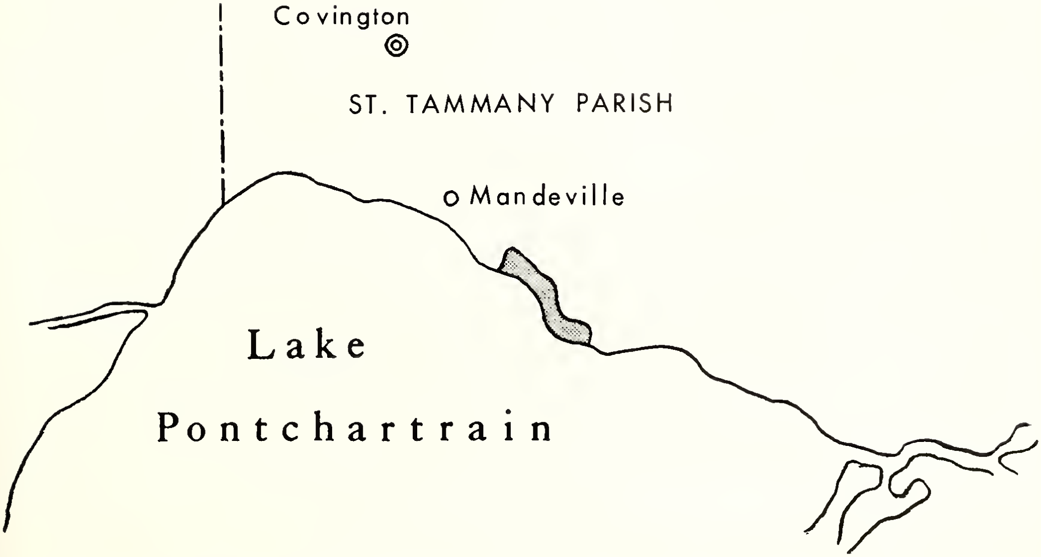
←

Measuring a nutria pelt at state fur auction house in Abbeville, Louisiana.

→

—(*Photos by Webert*)

St. Tammany Refuge



This 6,000-acre refuge located in St. Tammany parish, runs for eight miles along the shore of Lake Pontchartrain and joins the Fontainbleu State Park. This property was bought by the state and was authorized as a game refuge by Legislature Act No. 52 of 1938.

ST. TAMMANY GAME REFUGE

Work Done

Corrected and posted boundary lines.
Made a game and fur animal survey of area.

Blue and snow geese feeding in three-cornered grass on Marsh Island

Dragline digging canal and building levee on Rockefeller Refuge.

—(*Photos by Webert*)

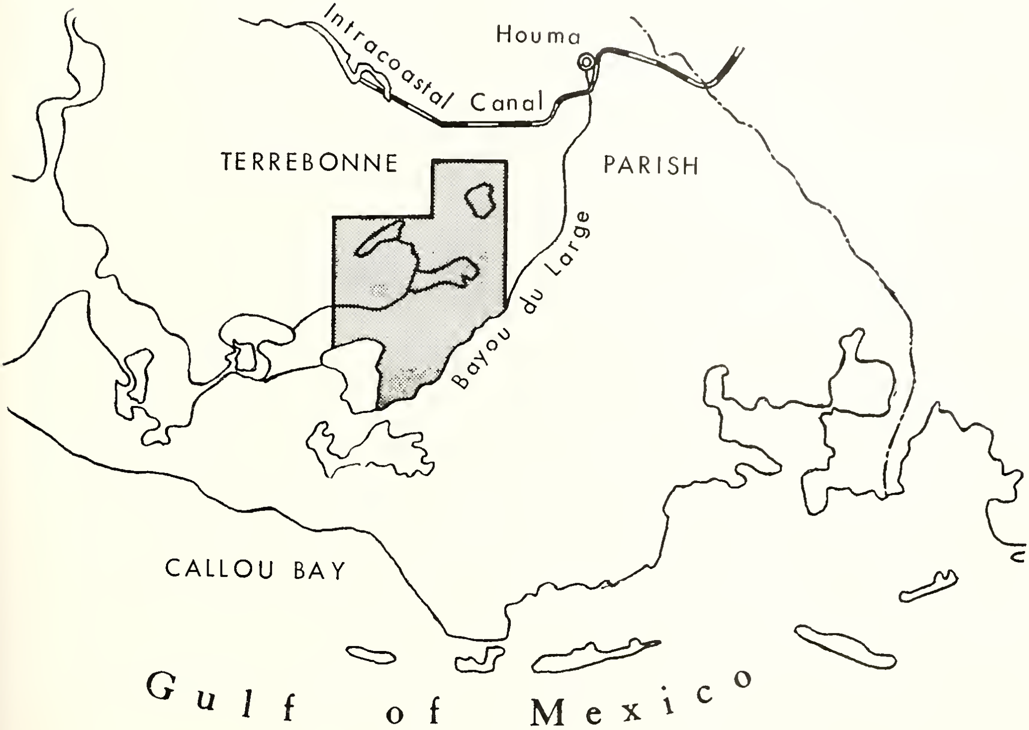
View along improved levee on Rockefeller Refuge. Levee now is high enough to keep out saltwater.

Spoil levee across mouth of small bayou on Rockefeller Refuge, prevents both saltwater intrusion and loss of freshwater.

* * *

New canal and levee construction on Rockefeller Refuge by oil companies under supervision of biologist.

Terrebonne Public Hunting Grounds



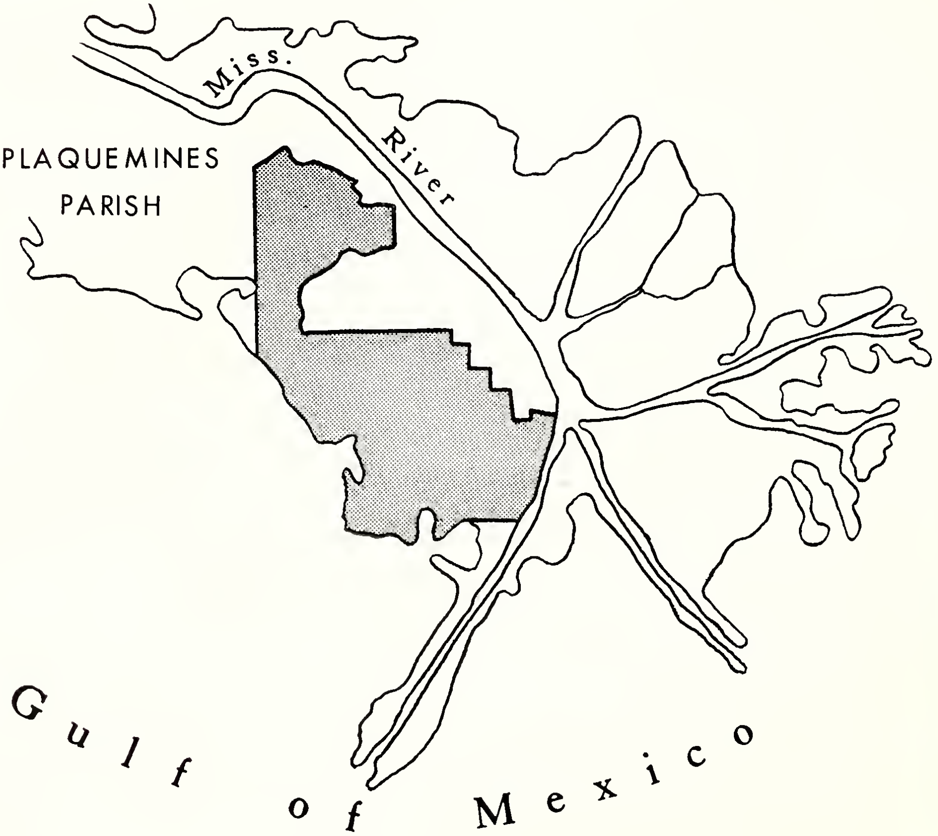
Public Shooting Areas

Within the past 10 years in the Louisiana coastal marshes the barriers, both natural and man made, that served to protect a large percentage of the Mississippi Flyway's wintering waterfowl in their solitude are in the process of being swept away and made accessible to civilization by the encroaching industrial activities brought about by oil exploration, seafood industries, drainage canals, agriculture and new highways and roads.

One type of structure used to control water level, salinity and erosion

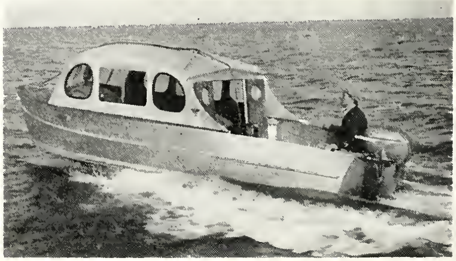
Museum of natural history at L. S. U. materially aided by Fur and Refuge funds.

Plaquemines Public Hunting Grounds



In Southwest Louisiana this, with the increased population, has resulted in the establishment of private hunting clubs, leaving the average person with literally no land upon which to hunt.

These phenomena initiated the Fur and Refuge Division into the action of searching for remaining marshland that could be set aside as public hunting grounds. Marshlands that would not be prohibitive from a standpoint of waterfowl management, cost, and accessibility to a large population of hunters. To date two such areas have been located—one in Terrebonne parish and one in Plaquemines parish. Both 60,000-acre blocks cut through the entire salinity range found on the Gulf Coast making salinity and water level manipulations possible. These two areas are within natural waterfowl concentration points. Small-boat landings connected to adjacent paved highways lead to New Orleans and Baton Rouge.



An aluminum boat used for shallow water work on Marsh Island.

Plane spraying ponds on Pass-a-Loutre. Note gray duck moss on pond's surface. Moving hyacinths will become entangled in this moss and be uprooted, thereby ruining excellent duck food.

→

Aerial view of canals and ponds choked with hyacinths on Pass-a-Loutre.

Steamboat pond at Pass-a-Loutre cleared of hyacinths. Same area as shown above before hyacinth control.

→

Hyacinths dying 24 hours after being sprayed with 2,4-D.

←

—*(Photos by Webert)*

utria Investigations

During the first four months of 1953, 15,000 arked nutria pelts were closely watched first by his Division in Louisiana, then when the furs eached New York, by Dr. F. G. Ashbrook, in harge of wild animal investigations, United tates Fish and Wildlife Service.

This investigation revealed the following in-ormation:

Nutria pelt primeness is at its peak between anuary 1 and March 5. Pelts trapped after arch 5 began to show signs of springiness, ere of a browner color, less dense, with fur dis-laying a woolly appearance. Pelts trapped before anuary are inferior as to color, density and ngth of fur.

* * *

Marsh Island Headquarters camp.

The MUSKRAT, major Fur and Refuge boat, comes in for a landing at State Wildlife Refuge.

* * *

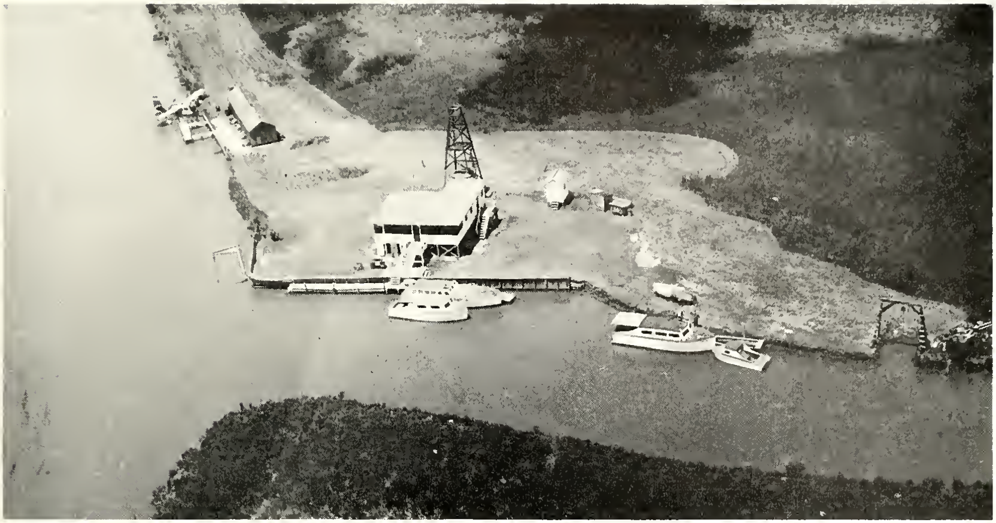
The South American nutria is larger and has a denser fur. Both South American and Louisiana nutria are equal in durability and quality and Louisiana nutria is definitely superior in color, is darker, makes a lighter weight coat and is silkier.

The adverse publicity associated with the Louisiana nutria is due primarily to improper handling by trappers and by early caught (unprimed) pelts reaching the market.

Nutria pelts marked with nail-holes can be identified after being handled from trapper to dresser.

The 1954 nutria crop of an estimated 200,000 pelts moved evenly and strong throughout the season. Base prices used for the 26-inch skins started off at $2.00 and ended up at a strong $2.75.

View showing growth of three-cornered grass and its competitor, wire grass. Proper burning produced thousands of acres of this grass which is ideal food for muskrats and geese.



Headquarters camp at State Wildlife Refuge showing boats, BEAVER, GRAND CHENIER, MARSHLAND AND FOX

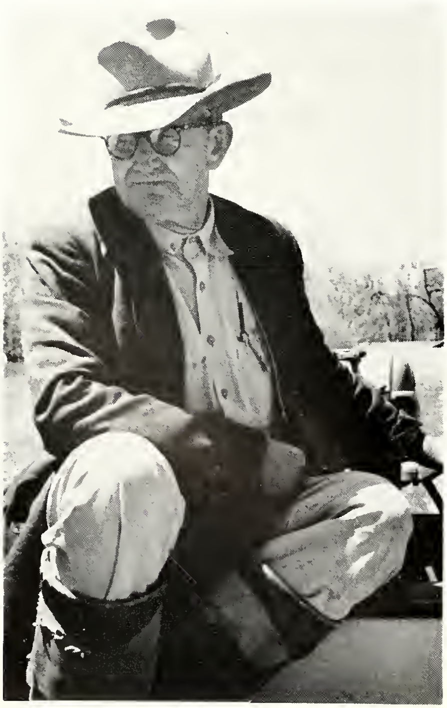
Damming-up tidal guts on overly-drained marshes for the purpose of raising water level to a point suitable to growth of food plants for waterfowl and furbearers.

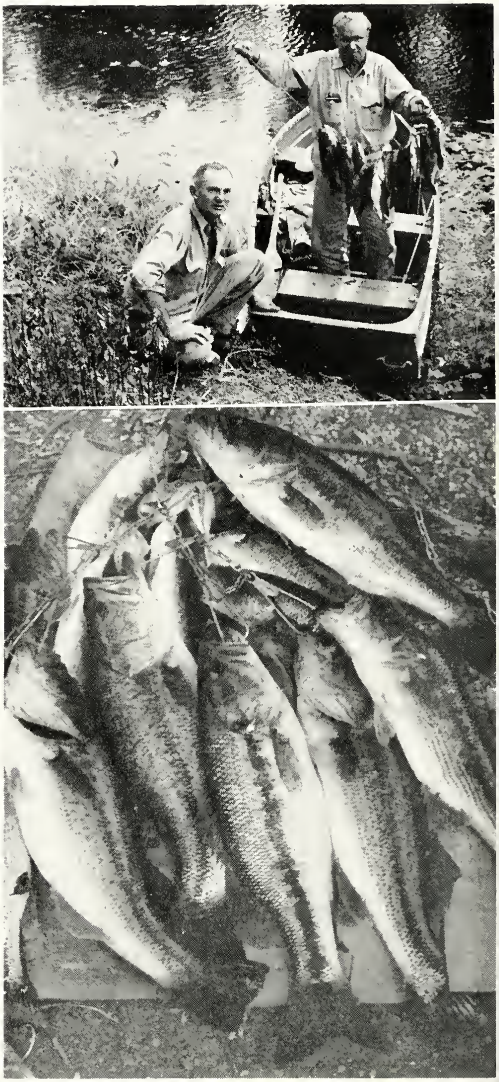
George Welch, Rockefeller Refuge manager and young angler to-be.

Zoned Plaqumines Parish for Trapping Season

Since the temperature of this area of this state is influenced by the Mississippi River and surrounding Gulf waters, the season was set back until December 1 on all furbearers to offset a known two weeks lag in fur primeness on the delta.

Experimental pelt primeness studies will be carried out on the Mississippi delta for the purpose of determining the effect of the 40° water temperature upon nutria during the late spring.


Fred Freeland, manager, Morehouse Refuge.


Tensas River, which runs through the Singer Refuge, produced these Kentucky spotted bass.

Division of

Oysters and Water Bottoms

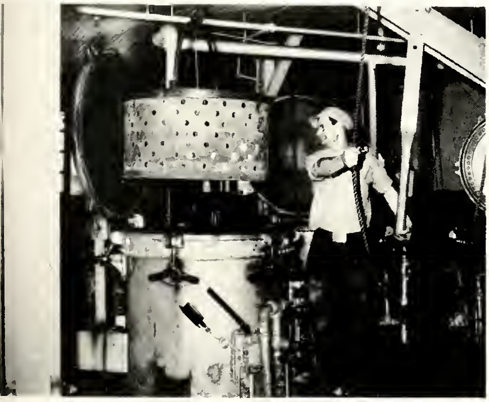
James N. McConnell, Chief

. . . operations in progress.

The Division of Oysters and Water Bottoms is proud to be able to report a large increase in oyster production during the past biennium over the seasons 1949-1950 and 1950-1951. This increase has been accomplished in spite of the fact that more and more of our best oyster areas are becoming producng oil fields, and an additional large sulphur operation is now being carried on in a former oyster producing area.

It has been most gratifying to find that more and more cooperation is being accorded the Louisiana Wild Life and Fisheries Commission by all of the major companies where operations are now in progress. In our opinion, one of the most forward steps ever undertaken by this division, and probably one which will have the most far-reaching effects for all the divisions of the Commission, was a conference held in New Oreans on September 15, 1953. This conference was called under the auspices of the Division of Oysers and Water Bottoms to discuss problems arisng from geophysical operations, the laying of pipelines, and the dredging of canals in our coastal waters.

Attending this conference were representatives of the Louisiana Wild Life and Fisheries Commission, State Mineral Board, Louisiana Department of Conservation, State Board of Health, Louisiana Department of Public Works, U. S. Corps of Engineers, U. S. Coast Guard, U. S. Fish and Wildlife Service, Louisiana Wildlife Federation, Ducks Unlimited, Gulf States Marine Fisheries Commission, Louisiana Oyster Dealers and Growers Association, Seafood Committee of the Houma-Terrebonne Chamber of Commerce, Louisiana Land and Exploration Company, Marshlands, Inc., Apache Exploration Company, California Company, Continental Oil Company, Delta Exploration Company, General Geophysical Company, Gulf Refining Company, Humble Oil and Refining Company, Phillips Petroleum Company, Shell Oil Company, Southern Natural Gas Company, Stanolind Oil and Gas Company, Sun Oil Company, Texas Company, Tide Water Associated Oil Company, Union Producing Company, United Gas Pipe Line Company, Freeport Sulphur Company, and numerous individual oyster dealers, trappers and shrimpers.



When oysters are canned they are next steamed to insure the housewife that the choice morsels may be kept indefinitely.

There is no better way to acquaint the members of our State Legislature with the object of this meeting than to quote part of the opening statement of the director, L. D. Young, Jr.:

"This meeting has been called today for the purpose of obtaining factual information regarding a problem that has grown as the days have gone by. We know that industrial development is a sure thing in Louisiana, one that has been coming and will continue to grow as we progress. We, of the Louisiana Wild Life and Fisheries Com-

A Louisiana port of entry—the camp at Grand Pass, with the CAPTAIN SANDRAS and the LA LOUTRE, division boats tied to the wharf.

mission, are concerned with this development in that inroads are being made into our fisheries, oyster and fur industries, and certainly one that has given us a great deal of concern.

"We have invited the various state agencies, those connected with the industries of our state, the U. S. Engineers, and others who are vitally concerned. We are going to hear from all of you. We are certainly expecting that you will give all the factual data and information that you wish . . . "

Geophysical Regulations Added

Because of the numerous complaints registered at our meeting of September 15 against leaving pipes in our coastal waters by some of the geophysical companies operating there, it was decided to call another conference, This meeting was held on October 5, 1953, to discuss change in seismic regulations regarding the use of pip in coastal waters.

Attending this conference were representatives of the Louisiana Wild Life and Fisherie Commission, U. S. Corps of Engineers, Apach Exploration Company, Broussard Exploratio Company, California Company, Cities Service Oi Company, Continental Oil Company, Delta Exploration Company, Evangeline Seismic Company Geophysical Service, Inc., General Geophysica Company, Gulf Refining Company, Gulf Researcl and Developing Company, Humble Oil and Refining Company, Lafayette Exploration Company Louisiana Oil Exploration Company, Marine Exploration Company, Petty Geophysical Engineering Company, Phillips Petroleum Company, Pop Geophysical Company, Pure Oil Company, Ray lex Exploration Company, Seaboard Oil Company, Shell Oil Company, Sohio Petroleum Company, Stanolind Oil and Gas Company, Sun Oil Company, Superior Oil Company, Texas Company, Tidelands Exploration Company, Tide Water Associated Oil Company, Union Producing Company, United Geophysical Company, Dixie Chemical Company, Grand Caillou Packing Company, Gulf States Marine Fisheries Commission, Houma-Terrebonne Chamber of Commerce, Hunter Laboratories, Inc., Indian Ridge Canning Company, Louisiana Oyster Dealers and Growers Association, Omes Oyster House, Tex-Tube Supply Company and others.

At this meeting the necessity for changes in seismograph regulations due to excessive damage to the fishing industry caused by geophysical operations in our coastal waters was discussed. Suggestions were requested concerning the best methods for handling the pipe problem in future operations, as well as methods to be employed in clearing our coastal waters of pipes left by geophysical operations in the past, some of these pipes above the water and others broken off between the surface of the water and the bottom.

As a direct result of the October 5 conference, the following new regulations were formulated and were scheduled to become effective November 5, 1953. However, at the request of the pipe supply companies who stated that it would be impossible to furnish enough stencils to mark the pipe by that date, the effective date was extended to November 15, 1953. The regulations follow:

1. All parties using pipe must have clearly stamped at each end of each joint the name or abbreviation of the name of the company using the pipe.
2. All parties using pipe must pull such pipe before leaving the shotpoint.
3. All 2x2s used for survey lines must be clearly stamped with the name of the com-

Big oysters headed for markets over the nation

. . . and they're mighty fine on the half shell, too.

pany using the stakes at approximately three-foot intervals.

4. All 2x2s used for survey lines must be pulled upon the completion of the prospect.
5. No pipes should be left in the waters during crew off-time.
6. Conservation agents will assist the U. S. Engineers in seeing that all pipes are pulled, but the responsibility will still rest with the geophysical operators to remove the pipe.
7. Permits will be issued for a period of six months from date of issue, but may be renewed for not more than two additional 90-day periods at the discretion of the director of Wild Life and Fisheries. Applications for renewal may be made in letter form.

Labor Shortage Is Problem

The problem of obtaining the necessary labor is one of the more difficult ones facing the oyster producer in Louisiana today. To get his labor today, the oyster producer is in direct competition with the tremendous mineral operations in our coastal waters. The oysterman of necessity works long hours doing heavy physical work with long periods away from home. In contrast, the usual worker in mineral operations has shorter hours, less heavy physical work and the best food obtainable. In addition to this, he has considerably more off-time. Resultant from this, there is a very limited supply of oystermen, and from this small group the producers are continually trying to outbid one another for labor. The continuous shuttling back and forth of the same men among several of the larger producers results in loss of time and efficiency.

Operation 'Shell Planting'

During the late spring of 1952, 51,117 barrels of oyster shells were planted as cultch in the State Seed Oyster Reservation at Sister Lake. These shells were planted at a unit price of $0.55 per barrel at a total cost of $28,114.35. Good results were obtained from this planting.

During June and July of 1953, 30,474 barrels of oyster shells were planted in Sister Lake at a unit price of $0.48 per barrel at a total cost of $14,627.52. Results from this planting have not as yet been ascertained.

East of the Mississippi in St. Bernard parish, Mississippi canners returned without cost to Louisiana 10 per cent in shells of the amount of oysters removed from Louisiana and packed in Mississippi. During May 1952, 35,841 barrels were planted under our direction and supervision near the southern shore of Grand Island, or Halfmoon Island as it is commonly called. Halfmoon Island is located at the junction of Lake Borgne and Mississippi Sound. A most exceptional catch was obtained from this planting, and in the period of one year only, many of the young oysters had obtained a total growth of more than three inches from hinge to tip of shell.

Because of the good results obtained from the 1952 planting, the return of shells from Mississippi in May of 1953 amounting to 29,817 barrels were planted in close proximity to the bedding of 1952, and a good catch of spat has resulted.

State Seed Oyster Reservation

On July 10, 1953, Sister Lake was opened to the tonging of seed oysters, and only one oyster fisherman saw fit to take advantage of this opportunity to replenish his oyster beds—1,475 barrels of seed oysters were removed with hand tongs.

On October 1, 1953, Sister Lake was opened to dredging of seed oysters under the following conditions:

1. That light dredges only be used, not to exceed 115 pounds complete and to have not more than 16 teeth measuring not more than four and a half inches below cross bar.
2. That all boats will check in and have dredges examined and weighed by our inspectors at the State camp in Sister Lake.
3. The period for dredging will not exceed 45 days from the opening date of October 1, 1953. However, if in the opinion of the chief of this division either any part of the entire lake has been over-dredged prior to the 45-day period, either certain sections or the entire lake shall be closed. This is deemed necessary so that the lake may be dredged annually.
4. The area where shells were planted in 1953 will be staked off and no dredging allowed within staked section.
5. All boats must first obtain permits from our inspectors at the camp when having their dredges weighed, and before leaving the lake must have their cargo checked at the camp where complete records of removals will be kept as has been done with the tonging operation.
6. If in the opinion of the chief inspector any boat has too much draft and the propeller is damaging the reefs, this boat shall be barred from operating in the

Diamond-back terrapins are a source of revenue in Louisiana, but this one with oysters on his back is more valuable . . . and the captor seems pleased enough about the entire situation.

Lake. Should excessive low tides occur, the dredging may be temporarily suspended.

The total number of seed oysters removed by dredging amounted to 90,113 barrels. On January 15, 1954, the lake was closed to all oyster operations.

Oyster Harvester Sold

The oyster harvester Milgene was purchased by this division after a number of fishermen and canners as well as officials of the Department of Wild Life and Fisheries had witnessed several production runs. The object of the purchase of this machine was to transplant seed oysters from shallow and overcrowded reefs to depleted and supervised oyster growing areas.

During 1952 it became apparent that conditions had so changed in the natural reef area that there were no more overcrowded reefs and the usefulness of the Milgene as a harvester was no longer necessary. It was at first decided to remove the conveyor and outfit the barge as a floating self-propelling laboratory. However, when making a careful survey of the hull interior it was found to have dry-rotted to such an extent that it was necessary to remove all equipment and sell the barge with self-propelling unit.

Coastal Waste Control Activities

Inasmuch as the Stream Control Commission Act designates the Wild Life and Fisheries Commission to be the enforcing agency for the Stream Control Commission, it has been the duty of the Division of Oysters and Water Bottoms to enforce the Commission's rules and regulations in coastal waters.

A patrol boat manned by a captain and a waste disposal inspector constantly makes routine inspections of all production installations and drilling operations in the southeast Louisiana coastal areas. Patrols are also made by plane as well as by car. Whenever violations of the rules governing oil field waste are found, steps are taken to compel the violator to correct the violation. On many inspections samples and photographs are taken and are filed, together with reports of the violation, in the offices of the Division of Oysters and Water Bottoms and Stream Control Commission.

During these patrols all canals and bayous are policed and oil transportation barges under-

Jack Hood, waste disposal inspector, makes a routine check in oyster reef areas to ascertain if any harmful waste is damaging the rich coastal reefs.

Oysters are opened by hand after steaming for canning.

way are inspected. Complaints that are brought to the attention of the Division of Oysters and Water Bottoms office are given immediate attention. Weekly reports are filed on all violations with the Division of Oysters and Water Bottoms and the Stream Control Commission and samples and photographs which may have been taken are carefully marked and filed.

Airplane Activities Outlined

The Seabee amphibian airplane which is used in the Division of Oyster and Water Bottoms only displaces 18 inches of water and can travel in shallow waters in many cases where boats cannot go in order to complete negotiations of oyster leases.

The work of the airplane saves time, being able to transport employees, supplies and materials to the different camps quicker than going by boat.

Violations which occur frequently may be brought to a minimum by communication of radio and having the plane fly an agent to the place where a violation takes place, making an arrest or seizure, whichever the case may be.

Due to the heavy increase in oil production in the coastal waters of the state, periodic patrols are flown. Samples are collected from different locations by plane and brought in to the biologist for analysis to help prevent oil waste from contaminating the coastal areas.

On some occasions the chief of the Division of Oysters and Water Bottoms is flown to the different oyster camps and oyster beds to talk and check with the oystermen there regarding problems that may prevail and possible corrections to help preserve the oyster areas in Louisiana.

Future Plans Explained

The oyster areas lying east of the Mississippi River in the parishes of St. Bernard and Plaquemines and extending from the Mississippi Sound on the north to Quarantine Bay on the south, produce our largest amount of natural reef oysters. From this area are obtained approximately 90 per cent of the seed oysters transplanted west of the Mississippi River in the parishes of Plaquemines and Jefferson.

Because of the lack of rainfall and comparably low river stages which have occurred during the last two years, waters of higher salinities are coming farther inshore, and with this influx of waters of higher salinities comes *Thais haemastoma*, or the common oyster drill. During the past two years tremendous damage has been done by this organism in this section. It becomes essential that additional river water be obtained in this area.

The following recommendations by this division were approved by the Commission, and every effort is now being made to consummate these projects:

After having made a careful examination of the natural oyster reef area in the parishes of Plaquemines and St. Bernard east of the Mississippi River, it is apparent that, due primarily to the unprecedented lack of rainfall for the past two years in addition to the lack of river water, tremendous inroads have been made on these reefs by the oyster conch, probably the most destructive natural enemy of the oyster in Louisiana. These conchs cannot withstand low salinity, and since it is our belief that this natural reef area is the backbone of the Louisiana oyster industry, it is of the utmost importance that additional fresh water be obtained in this section.

For the above reasons, it is recommended that this Commission, in conjunction with the U.S. Engineers, the Orleans Levee Board and the Police Jury of Plaquemines parish do everything possible to find ways and means to open, with a controlled structure, Bayou Lamogue situated on the east bank of the Mississippi River opposite Sixty-mile Point and emptying into California Bay south of Mangrove Point. Should the Mississippi River water reach California Bay, tremendous areas of oyster reefs now dead because of high salinity and conch infestation would reproduce, and in our opinion, no other one thing can be done which would be of greater value to our natural reefs east of the Mississippi River.

Shell plantings mean more oysters in future years.

In addition to this, it is recommended that for the same reasons this Commission join with Representative Hebert and the parish of St. Bernard in striving to obtain a control structure built where the Violet Canal formerly connected with the Mississippi River at Violet, Louisiana. River water from this project would flow through the canal and enter Lake Borgne, where it is badly needed to help rehabilitate oyster reefs in the northern part of St. Bernard parish.

During the past several years large amounts of oysters in the sack were brought to market through Bayou La Loutre to Hopedale and Yscloskey and it is recommended that this Commission urge the U. S. Engineers to dredge and maintain a channel with a minimum depth of five feet from Bayou St. Malo to Yscloskey.

Because of the critical situation now existing in our natural reef area, it is also recommended that the Commission issue an edict that all canning plants obtaining oysters from the natural reefs in the parishes of St. Bernard and Plaquemines increase the percentage of shell return from the present 10 per cent to 20 per cent, these shells to be bedded at the canner's expense under the direction and supervision of the chief of the Division of Oysters and Water Bottoms.

Report of Collections (Fiscal Year)

RECEIPTS

	1951-52	1952-53
Oyster Bedding Ground Rental	$ 36,277.00	$ 41,532.00
Privilege Tax	12,985.58	12,031.01
Tonnage Licenses	1,469.00	1,382.00
Dredging Licenses	8,100.00	8,900.00
Resale, Shop, Etc.	735.00	710.00
Transfer fees	35.00	23.00
Sand	1,031.85	1,415.52
Shells	156,793.86	224,974.41
Gravel	....	....
	$217,427.29	$290,967.12

Report of Production (Calendar Year)

TOTAL BARRELS OF OYSTERS TAKEN FROM LOUISIANA WATERS

	1952	1953
Terrebonne	141,602.00	83,009.50
Lafourche	36,962.50	112,461.00
Plaquemines	133,028.00	225,575.50
Jefferson	61,087.50	22,337.00
St. Bernard	513,036.80	349,691.36
Total Barrels	885,716.80	793,074.36

TOTAL CUBIC YARDS OF SAND, SHELLS AND GRAVEL TAKEN FROM LOUISIANA WATERS

	1952	1953
Sand	62,294.92	220,367.92
Oyster Shells	1,642,995.32	584,366.07
Clam Shells	2,054,926.64	1,506,632.88
Gravel	216.00	2,172.00

The Gulf Coast Conch, Thais haemastoma

Probably the most destructive of all the natural enemies of the Louisiana oyster, *Crassostrea virginia*, is the oyster drill or borer, *Thais haemas-*

Two oyster boats go to bedding grounds under the supervision of the Oyster and Water Bottoms division crew aboard small craft.

toma. This species feeds on oysters and other bivalves almost exclusively.

The borer, to obtain its food, drills a round hole through the shell of the oyster and extracts the meat by means of an extensible proboscis. Young oyster spat seem to be preferred when obtainable; however, any size oyster may be attacked. When larger oysters are used for food the ventral edge of the shell is most often the point of entrance, and in places where drills are plentiful and oysters scarce we have seen as many as eight drills attached and feeding on one large oyster, all of them entering through the shell edges. From our observations it seems that the softest parts of the oyster are eaten first and the tougher muscle area last. This serves the conch in good stead, for if the muscle were eaten first, the shell would partially open and crabs and fish would quickly devour the exposed oyster meats.

Breeding Habits

Breeding season in Louisiana seems to be governed by water temperature and usually starts in early April and runs into July, with a peak period reached in May. At this time *Thais* becomes negatively geotropic, for the breeding period only, and climbs on any elevated object to lay its egg capsules, being careful to deposit these capsules below the low water line. The egg capsules are fastened to this elevated object thereby becoming free from debris and silt. Martin D. Burkenroad, in his paper on *Thais haesmastoma*, written while working in Louisiana, states that "each capsule contains about 1,000 eggs and a female produces 100 or more capsules."

An oyster boat pulls into dock to unload cargo at canning plant.

Methods of Control

Permanent control is almost impossible, for the young larvae when hatched from the egg capsule are free-swimming, and although unable to stand water of low salinity will come back into areas again as soon as the salinities are favorable. It is our understanding we can use as a salinity tolerance, the figure of approximately 15 parts per thousand. Where many conchs invade privately leased grounds, fishermen take advantage of their natural climbing instinct during the breeding season and attach palmetto fronds to poles and stake off their leases with these traps which they run two or three times weekly, sometimes even daily. The stakes are pulled up and the climbing egg-laying conchs are shaken off into their boats. The conchs thus gathered are usually deposited on land in large piles where they dry up and become an olfactory nuisance for several months.

Although there has been some small demand for these animals to be used for food in the New Orleans area, it has only been in the last year or two that there seems to be a demand from the Eastern markets for processed canned conchs. The Golden Meadow Fisheries Company, one of our local canning plants, has been processing and canning these drills experimentally for the last two years. It is our understanding now that from one Eastern concern alone an order has been received for twenty to thirty thousand cases of these canned conchs.

When properly cooked and handled, these oyster enemies could become a tasty and nutritious addition to the nation's food supply.

As an incentive for the gathering of these animals in large quantities, the Golden Meadow Fisheries Company will pay much more per barrel for conchs than is now being paid for oysters, provided large enough quantities can be obtained for canning purposes. It seems probable that only during the breeding season when large concentrations of these animals occur that sufficient quantities can be obtained for canning.

There is one other possibility that occurs to the writer of obtaining a large supply of conchs for canning. During the last several years, more and more of our oyster fishermen are turning to the transplanting, for steam canning purposes primarily, of seed oysters from the natural reefs east of the Mississippi River to the higher salinity growing grounds west of the river, principally in Plaquemines and Jefferson parishes. This transplanting occurs during the months of September, October and November, and during the months of January, February, March and April and part of May are removed by "shovel back" dredging operations and brought to the steam canning plants for packing. In many places in this high salinity area large quantities of conchs have gathered to feast on the transplanted oysters, and since the fisherman ordinarily cleans his beds by dredging after the season so as to prepare his leased areas to receive the new planting in September, it seems quite feasible that at this time, for at least a two-week period, a collection system could be instituted that would make it financially profitable for a canning plant to continue to operate after the closing of the oyster season.

In summarizing, it seems to this writer (McConnell) that the best way in Louisiana to combat the oyster drill is:

First, to plant your seed oysters in areas where the water salinities remain normally below the tolerance figure of fifteen parts per thousand.

Second, to continue and increase the present method of trapping with poles and palmetto fronds during the months of April, May and June.

Third, to continue to increase the demand for canned conchs which seems to be a tasty and excellent food product.

As the demand increases, more fishermen will become interested in supplying the conchs not only for the financial consideration but primarily because they will be helping to eliminate (in high salinity areas) the Gulf oyster's most potent natural enemy.

Report on Biological Section

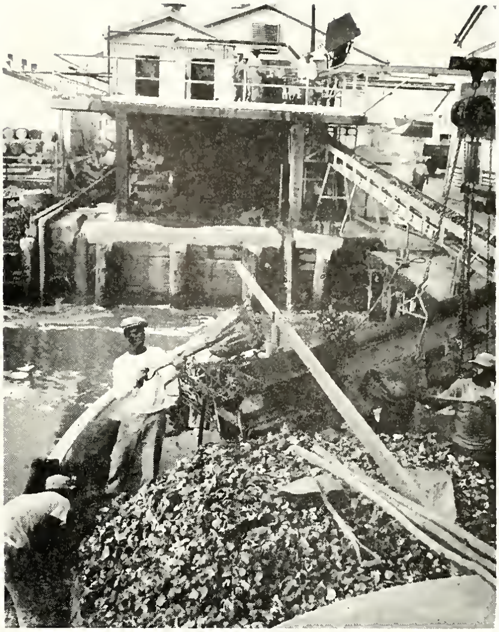
Lester L. Walters

Marine Biologist

Division of Oysters and Water Bottoms

Biological Section, Division of Oysters and Water Bottoms, activities which were carried on during the 1952-53 biennium can be separated into three general projects as follows:

1. Laboratory and office facilities were repaired and established to aid biological investigation.



From the boat to the conveyer at a canning plant.

2. Collection of salinity and temperature data and cursory observations on oysters were continued.
3. Reports were prepared and submitted to the division.

The biological staff which carried on this work fluctuated and was rather uncertain during the 1952-53 biennium; it fluctuated between seven members through May 1952, to two members since May 1953. The writer expresses sincere appreciation and high praise for the exemplary assistance rendered by the various personnel.

Laboratory facilities at Sister Lake (Caillou Lake) were improved and repaired to an extent to permit the initiation of intended laboratory and field biological investigations on oysters. An office and laboratory was established at Waveland, Mississippi; previously, these facilities had been situated in a portion of the laboratory space made available through the co-operation of Frank Coogan, Chief, Division of Research and Statistics, Baton Rouge.

Routine collections of salinity data were continued at four observation stations; namely, Little Bayou Pierre Port of Entry, Bay Gardene, Lake Felicity and Sister Lake Seed Oyster Grounds. For the most part, these records now extend over

This giant cluster is destined to make some seafood lover happy.

the calendar years 1951-53. Supplementary and much less frequent salinity values were recorded at other stations between Sister Lake and Grand Island (Halfmoon) in Mississippi Sound. In addition, continued routine water temperature (° C.) thermographs were obtained at Little Bayou Pierre Port of Entry. This record now extends over the calendar years 1951-53. These data were supplemented by water temperature (°C.) thermographs recorded at Sister Lake for the periods January 1-May 9, 1952, and September 30-October 20, 1952. Routine temperature records and water samples were collected by various personnel within the division; their assistance is acknowledged and highly praised.

Biological progress reports on various cursory observations and miscellaneous reports were prepared and submitted to the division as follows:

1. Outline of suggested permanent biological program to be financed by the Louisiana Department of Wild Life and Fisheries, Division of Oysters and Water Bottoms, February 6, 1952, 2 pp.
2. A report on the Jurisich Oyster Harvester Milgene showing the operational costs and production in terms of barrels of oysters transplanted for the calendar year 1951, February 1952, 13 pp.
3. A report on seed oyster reservations and future program for incorporation in the biennial report covering the calendar years 1950-51, 14 April 1952, 7 pp.
4. A report on the association of conducted seismographic operations and coincidental oyster mortalities in Bay Lanaux (Bay Lassus) on or adjacent to oysters or water bottoms owned or leased by O. G. Salinovich, G. Salinovich and Leon Lassus, 4 May 1952, 13 pp.
5. A final report on an investigation conducted to determine the association of oyster mortalities and seismographic operations said to have been conducted in the vicinity of Bird Island, 7 May 1952, 6 pp.
6. A final report on the oyster shell planting conducted at Sister Lake June 25 through July 8, 1952, 11 July 1952, 66 pp.
7. Over-all suggested permanent biological program to be financed by the Louisiana Wild Life and Fisheries Commission, Division of Oysters and Water Bottoms for the coming year, 13 March 1953, 5 pp.
8. A final report on the oyster shell planting conducted at Sister Lake 27 June through 3 July 1953, 10 July 1953, 19 pp.
9. A progress report on cursory observations conducted at Bay Gardene Seed Oyster Ground, 28 July 1953, 42 pp.
10. A progress report on cursory observations conducted at Sister Lake Seed Oyster Ground, 15 October 1953, 43 pp.
11. A progress report on cursory observations conducted at Lake Felicity Seed Oyster Ground, 15 October 1953, 16 pp.

Other biological reports have been in progression. These reports are relative to cursory observations and information collected at Bayou Pierre Port of Entry and Mississippi Sound in the vicinity of St. Bernard parish. In addition, during the past year the writer carried on a rather extensive review of literature and pertinent information relative to Louisiana oysters.

Possible Future Plans

Advised future activities include the completion of biological reports in progression and continued routine collection of salinity and temperature data. Beyond this scope suggested directions to be pursued in future planned biological investigation on oysters are not postulated.

Division of
Research and Statistics

Frank J. Coogan, Chief

. . . absolute necessity

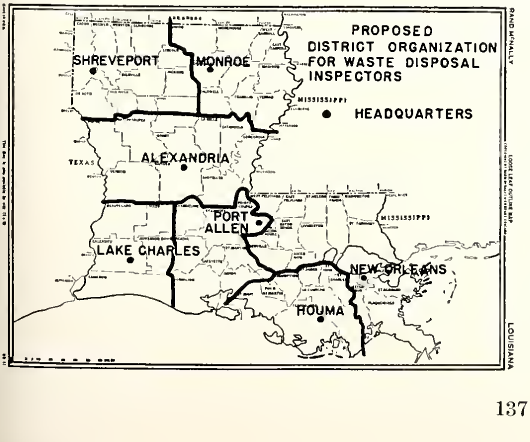
The managements of those industrial establishments whose waste discharge causes gross pollution of any of the state's streams will have to order the installation of the necessary treatment facilities or face legal proceedings, including injunctive requests instituted by the Louisiana Wild Life and Fisheries Commission.

This policy of impartial effective enforcement was adopted by L. D. Young, Jr., Wild Life and Fisheries Commission Director, and Stream Control Commission Chairman, and confirmed by the Board of Commissioners of the Wild Life and Fisheries Commission.

The Stream Control Commission act sets up a six-man Commission to carry out the provisions of the act but makes no specific provisions for Stream Control Commission personnel. The act says that the Wild Life and Fisheries Commission shall enforce the rules, regulations and orders of the Stream Control Commission. In addition, the Division of Research and Statistics has been designated as the group to make the necessary investigations and to supply the data and information on which the Stream Control Commission might properly base its orders and findings.

Notices and Orders

When it has been determined that effluent discharges from a particular plant is causing the pollution of the receiving stream, information to that effect is submitted to the Stream Control Commission. Acting on this information, the Commission can and usually does order the Stream Control Commission secretary to serve on the offender a Notice of Determination that the pollution is occurring or has occurred and directing the company to file with the Commission, within 10 days, a statement, setting forth in some detail just what steps have been taken or are going to be taken to abate the pollution.



The usual procedure following receipt of the answer from the company is for the Commission to consider the answer carefully, to sometimes request that an additional visit be paid the establishment by the research division personnel, and eventually to either accept the Notice of Determination answer as satisfactory or direct that a cease and desist order or some other restrictive order be served on a responsible official of the company concerned.

The cease and desist order or any other type of restrictive order issued by the Stream Control Commission is done so under specific provisions of the Stream Control Commission Act. This is the method used by the Commission to carry out the directive of the act, to control pollution.

There are many types of restrictive orders that can and have been written, orders setting forth the biochemical oxygen demand that can be discharged to a water course per day, orders listing the amounts in pounds per day of the various components of a waste to be discharged. The type and variety of the orders that have been and probably will be issued in the future are many and varied and depend almost entirely on the type of waste of manufacturing establishments involved.

> **The two main requirements of an order are: First, that it must be reasonable; and second, that the order be technically correct.**

The reasonableness requirement is an absolute necessity if the order is to stand the scrutiny of the courts. The three-judge Federal Court that heard the petition for a permanent injunction against the Stream Control Commission made particular mention of the provision of the act requiring that all orders of the Commission be reasonable.

The second requirement that the order be technically correct hardly needs any explanation. Any order that is based on erroneous assumptions or incorrect calculations would be much worse than no order at all because it would have to be withdrawn and reissued and the new order would be under a cloud cast by the first incorrect order.

Legal Machinery

To appreciate the importance of the policy decision of the director to vigorously push the enforcement of Stream Control Commission rules and orders, there should be an understanding of the legal machinery used to bring about this enforcement. The punitive section of the Stream Control Commission act says that any person or company convicted of violating the Stream Control Commission rules, regulations or orders would be subject to a fine and a possible jail sentence.

The act directs that the attorney general of the State of Louisiana shall prosecute the case for the state in conjunction with the district attorney of the particular district involved.

To take legal action to force compliance with the Stream Control Commission act, a notice of determination and a valid, reasonable cease and desist order must have been previously issued. The order must have been in effect for sufficient time for the protest period to have passed without action by the recipient of the order.

If all these conditions have been complied with, if all is in order and most important, if it has been clearly demonstrated that the matter is serious and that there is no possibility of bringing about compliance with the order by across the table negotiations, then the chief of the Division of Research and Statistics, after consultation with Wild Life and Fisheries Commission attorneys and the Attorney General, files an affidavit with the district attorney concerned, setting forth the facts in the case and asking that the charges be accepted and that the case be put on the court docket.

At the time of the trial, division personnel offer such technical testimony as is available regarding the facts in the case, and the decision of the court guides future action in the matter.

Enforcement Problems by Areas

Vermilion Basin

The Vermilion River basin is in the center of the sweet potato growing area, includes the western most portion of the sugarcane growing and processing area, has many seafood packing plants within its borders and boasts of numerous oil and gas fields.

Considering the number of potential and actual sources of pollution within the basin, it's not surprising that we have to contend with an annually occurring gross pollution in the upper reaches of the main stem of the Vermilion. This pollution exists only during the fall and early winter months and is a result of the discharge of wastes from sweet potato plants located in the vicinity of Lafayette.

An extensive survey of the Vermilion carried out during the last six months of 1952 clearly showed that that portion of the stream in the Lafayette area was being overloaded with organic wastes, and that as this waste was discharged, that a stretch of the river was being depleted of oxygen and that a large B.O.D. load was being

Discharge of pump into impounding basin area of about 325 acres (note levee) at Southdown Sugar Mill, Houma. (Webb Photo).

Dam and discharge gate at main impounding basin, Esso Standard Oil, Baton Rouge, La.

←

Portion of lower waste impounding basin, Sphinghill Mill.

Upper waste water impounding basin of Springhill Mill, International Paper Company.

→

Pump used to lift cane wash water into 325 acre impounding basin, South Down Factory, Houma, La.
Bottom left

Main impounding basin at Esso Standard Oil Company, Baton Rouge.
Bottom right

built up in the river. As the waste discharge continued, this waste laden stretch grew larger and eventually covered many miles of stream.

When the first heavy rains of early winter fell in the headwaters of the Vermilion Basin, there was sufficient run-off to flush the river, to move the oxygen depleted and waste-laden river water down; and as it moved, it caused heavy fish mortality, the fish dying from lack of oxygen.

To bring about the cessation of this pollution, the Stream Control Commission has directed that appropriate orders be issued to cut the organic load to the point that the oxygen demand could be satisfied without oxygen depletion taking place.

These orders, based on the amount of pounds of biochemical oxygen demand per day that could be absorbed by the stream, will soon be served on the parties concerned.

It has been noted that during the past several cane grinding seasons that waste discharged into the Bayou Tigre–Bayou Petit Anse water system was causing an oxygen depletion with attendant fish mortality. The company whose waste discharge causes this periodic pollution has been served with a cease and desist order, and research division personnel will make periodic checks next grinding season to see that the order is being complied with.

It is believed that the above mentioned steps will go a long way toward cleaning up the pollution existing in Vermilion Basin.

Teche Basin Report

The Teche Basin is the "hard nut to crack," the one spot in the state that has had a serious pollution problem for many years. Up to six months ago, no steps had been taken that would effectively bring about the cleaning up the annual pollution of Bayou Teche, Bayou Yokley, Lake Dautreve and the several other water bodies receiving food processing wastes or sugar mill wastes or in some cases both types of wastes.

Before, during and after the last sugar season, periodic inspections of the eighty-mile portion of the Bayou Teche affected by mill waste discharge were made.

Careful study of the data contained in the survey reports indicated that in order to maintain a minimum of 2.5 p.p.m. of oxygen in the Teche during the grinding season, that each of the seven sugar manufacturing establishments contributing the organic load would each have to be alloted an equitable portion of the total pounds of B.O.D. that the Teche is capable of stabilizing each day during low flow. The B.O.D. could be allocated on the basis of pounds of B.O.D. per ton of cane ground per day. Then each company would have to take the necessary steps to dispose of the balance of the oxygen load in another way, by impounding or discharging to the swamp on one side of the Teche or into the Atchafalaya Basin on the other side.

The food processing plant located on the Teche would also receive an allotment of pounds B.O.D. per day, perhaps an average of the amounts going to the sugar mills.

The orders that would bring this allocation about are presently being drawn up and should have been issued on or about February 1, 1954.

The three other water bodies receiving organic wastes in the Teche Basin have been surveyed in a like manner. Since only one plant is responsible for the pollution of each water body, the problem of drawing up a reasonable and proper order for each is not a difficult one. In two of the three cases, management has already indicated that the necessary details have been worked out and that storage basins will be built before the next processing season. The third manufacturer has a somewhat more difficult problem, but it can and will be solved.

The outlined work should be done in the immediate future, and then most of the Teche Basin's contaminated waters will have been re-

26,300,000-gallon im- pounding basin of Newport Industries shown at bottom. Left treatment of Nuro waster at Newport by evaporation. Concen- trated waste then im- pounded.

ored to the point that the water can be put normal use.

ayou Choctaw Basin

This basin is immediately adjacent to the aton Rouge area, and so it is doubly serious hen stream pollution is allowed to ruin some ery fine fishing and recreational waters during good part of the year. The fishing is affected ecause it makes it necessary to have annual re-ocking if any fish are to be caught either in ayou Choctaw or lower Bayou Grosse Tete. ometimes the spring rises are not sufficient to raw fish into the affected area.

Five sugar mills discharge around 9,000,000 allons per day into either the main stem of the ayou or into the upper tributaries, and this olume of waste with an average B.O.D. of 100 .p.m. quickly depletes the oxygen in the stream nd the fish die.

Two of the five mills discharge a total of ,000,000 gallons day and the owner of one of the vo mills has agreed to put 3,000,000 gallons day ver the levee into a Mississippi River borrow pit. he management of the other high discharge mill as a difficult problem in that no land is available the immediate vicinity of the mill that might e used for a storage basin, and the millsite is o far away from the river to use that possible eans of disposal. It may prove necessary to se some of the least productive cane land for a orage basin location.

In any event, it is absolutely necessary that solution be found to the problem of preventing e pollution described above. In order to make sure of this, cease and desist orders will be issued whenever it is deemed necessary to bring this about.

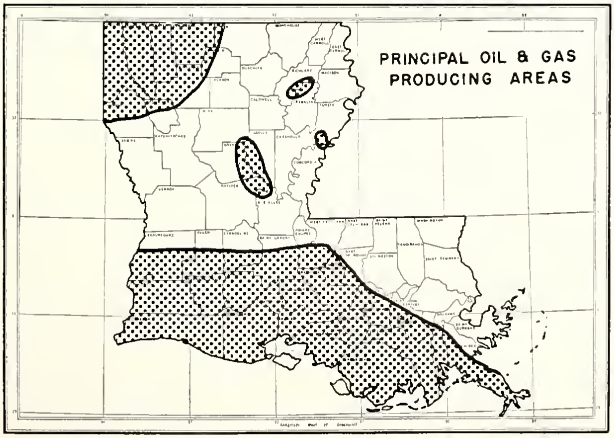
Bayou Maringouin receives sugar mill wastes from a single mill, and the relocation of the drainage pattern in this area has allowed this waste to cross over through a ditch into a canal flowing parallel to Bayou Maringouin. This new canal is wide and deep and carries a good volume but not enough to handle the waste so that oxygen depletion takes place and fish die.

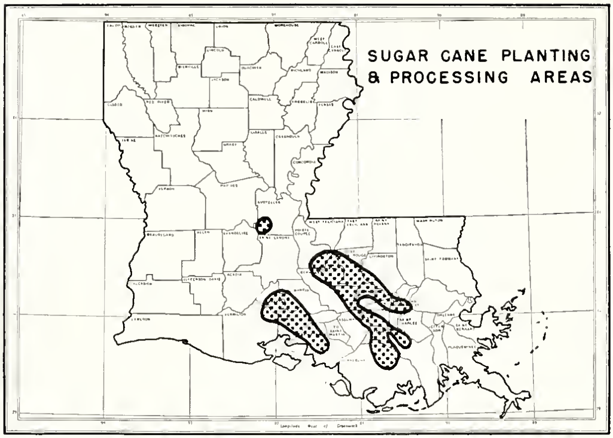
To keep this pollution from taking place, it is proposed that a low water sill be put in at the intersection of the cross ditch and the bayou to keep the waste from going into the canal during low flow periods. This will force the waste flow to go on down Maringouin as it used to, into a swamp where stabilization takes places without causing any trouble.

When all this planned work has been accomplished, it is believed that Bayou Choctaw Basin waters will be suitable for year round fishing and recreational uses, a real asset for the Baton Rouge metropolitan area.

Grand Bayou–Bayou Corne Area

The first real effort to clean up the sugar mill waste polluted waters was started in this area some several years ago, and only recently was it possible to persuade the management of one of the mills in the area to set about the construction of a 600-acre impounding basin to hold some 7,500 gal./min. of wastes for an indefinite period. The degree of stabilization that will be achieved in this impounding basin is not now known, but





it should be sufficient to remove almost all of the B.O.D. before the waste is discharged from the basin outfall.

Again in this area, the basic pollution problem has been complicated by so called improvements in parish wide drainage. A cross canal was dug between Grand Bayou and Bayou Corne. Instead of being confronted only with the problem of the pollution of Grand Bayou, we are now faced with the fact that under certain conditions Bayou Corne and the upper end of Lake Verret also are contaminated with the waste waters. Of course, it is realized that if the pollution of Grand Bayou is cleared up that automatically Bayou Corne will be taken care of, but this is only one example of several in the area where there was no pollution problem until drainage canals led water that normally went into marshes and swamps into some of the lakes and streams where damage could be done.

From time to time during the last several years, reports have been received that fish mortality has occurred in Lake Natchez during the sugar season, but it has not been possible up to the present time to confirm or disprove these reports. A closer check will be made of the area next fall and an attempt to ascertain the facts in this matter.

Bayou Lafourche–Bayou Black Area

There have been more corrective measures taken to reduce the damages resulting from cane sugar manufacturing wastes in this area than in any other part of the sugar cane belt.

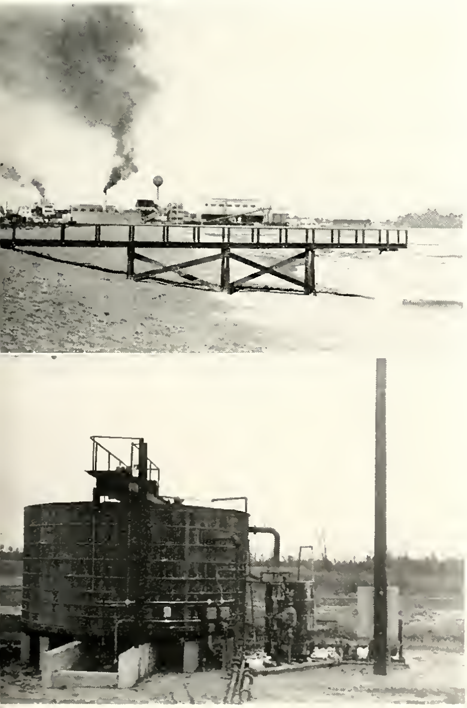
The vice-president in charge of manufacturing of one of the larger cane growing and processing groups in the state has shown a sincere an long continued interest in pollution abatemer and put his beliefs into practice by recommendin to his management that the first two impoundin basins of this type be built at two of the corporation's factories. The use of these basins durin the past season has brought about a materia improvement in the condition of the two wate bodies that receive the wastes from these tw mills. It is thought that with some additiona work on these two waste disposal systems tha they will function properly and that we ca consider the corporations' disposal problem solved.

The successful operation of these disposa systems has indicated, more than anything els the possibility that sugar mill wastes might b impounded, stabilized, and discharged, minus th heavy B.O.D. load, all this at a very moderat cost for most of the mills whose management find it imperative to lower polluting power of th waste discharged from their plants.

Shown above is one of two separate saltwater disposa plants, maintained by Shell Oil Co. for its well in th Iowa field. The saltwater disposal facilities consist o the two plants, auxiliary earth and storage pits, gathering and disposal lines and four usable saltwater disposa wells. (Shell photo).

The pollution of the Lafourche-Terrebonne rainage Canal is still another example of the roblems which sometimes arise as a result of arish-wide drainage systems. Up to several years go, there was no pollution problem to be found connection with the discharge of waste from e mill situated at the upper or east end of this nal. Then the canal was either cleaned out or redged out, and immediately afterwards the rouble began and has continued ever since. Not ly is the drainage canal polluted, but the wastes ow on through to the western end of Bayou lack and causes oxygen depletion and fish kills that water body.

To summarize comments on the sugar pollu-on problem, it is thought that for the first time nce this division was given the job of assembling nd processing stream pollution data, that some oncrete steps are being taken to cut down the ollution of the streams in the cane growing area. should be realized that all of these plans and roposals cannot be put into effect immediately, but it is sincerely hoped that the greater part of the program will be in operation before the next cane grinding season.



op photo shows view of outlet box structure of plant aste impounding basin at Newport Industries, Oakdale. ottom—20,000 gallon tank at Oakdale plant where dirt nd wood chips are separated from wood wash water nd overflow to a stockpile outside the plant. Clarified ater is then recycled, cutting the amount of water discharged as waste from 250 gpm to 25 gpm.

View of impounding basin at Greenwood Sugar Mill at Thidodaux (Dupre photo).

Little River–Catahoula Lake Area

For some time now there has been in effect a directive from the Stream Control Commission calling for the issuance of appropriate orders to the several lease operators in the Tullos–Urania–Georgetown oil fields. These orders are to be used to control the amounts of oil field brines discharged from these fields into the head waters of Little River.

It is considered that these orders, to be reasonable, must be very definite in wording and subject to clear interpretation as to the requirements to be met by the lease operators. It has been decided to control the amounts of brine to be discharged by setting an allowable based on a stream gauge height. Then for low flows, only 10 per cent of the total lease water productions can be discharged into the stream, the other portion being disposed of in some other manner. Then as the stream flow picks up the gauge height increases and a larger fraction of the total water production can be put into the stream. This appears to be a fair way to handle this problem; we shall see how it survives the test of time. These orders will be issued in the near future, and it is the writer's belief that all of the legal protection afforded the operators will be invoked.

Calcasieu River Basin

The overall condition of the waters of this basin is good. This is said advisedly, since it is realized that the Lake Charles area is rapidly becoming one of the south's most important chemical, petrochemical and petroleum refining centers. Any reasonable person realizes that it is not realistic to assume that waters receiving wastes from an industrial complex of this size will be as pure and undefiled as if there was no industrial waste disposal being carried out. But on the other hand, it would be extremely unwise to allow this industrial waste discharge to affect the Calcasieu River to such an extent that the river's value for recreational purposes would be destroyed, and so a happy medium or a middle of the road course must be followed. Outlined in some detail in another part of this report is the outline of the research program to be carried out in the lower Calcasieu during the next few months with the purpose of finding out in just what condition the lower river is in at this time and whether or not conditions warrant the restricting of any of the discharges from the various factories and refineries.

Most of the upper Calcasieu Basin is in equally good shape. There have been some excellent waste disposal facilities constructed in the area by two pine products plants that have been very effective in doing away with the detrimental effect that some of the waste waters have had on the Calcasieu and on Bundicks Creek.

This saltwater "knock-out" and disposal well was recently installed as part of Shell Oil Company's saltwater disposal facilities at the company's St. Gabriel field. (Shell photo).

In this basin is located the only company against whom the Wild Life and Fisheries Commission is presently taking legal action as a result of the violation of a Stream Control Commission order by that company. The chief of the Division of Research and Statistics has filed an affidavit with the District Attorney of the 31st District which should put the company on trial in district court charged with violating a legally issued order of the Stream Control Commission. This will be the first such case to be tried, and it will be most interesting to see what stands are taken and decisions rendered by the court having jurisdiction.

Industrial Waste Surveys

Several times in the fore part of this report mention was made of the necessity of having sufficient accurate data on hand when restrictive orders were being written so that the order would be technically sound. The only way to get such data is to survey the source of the pollution, keeping in mind always just why the survey is being made and what information must be obtained. Another type of survey is the one conducted to determine whether or not and to what extent a Stream Control Commission regulation is being violated. This last type of survey is usually run on large oil fields.

During the last year personnel of the division conducted four very important surveys, the first of which was the Vermilion River Basin Survey to locate all establishments discharging wastes to determine where these wastes were going, and lastly, to determine the amounts and characteristics of the wastes. This information was gathered during the summer months and just prior to the sweet potato packing season. At the same time periodic tests were being made on the Vermilion River itself to determine the condition of the water. The information was put together and from this information it was possible to decide the steps that must be taken to avoid the future contamination of the Vermilion.

A similar type of survey was carried out in the Teche basin with particular attention being paid to sugar mill waste volumes and B.O.D. values and to the condition of the Teche before, during and after grinding. The data gathered was such as to allow its use in calculating the amount of pounds of B.O.D. per day that could be discharged into the Teche without causing an actual oxygen depletion.

A two-pronged investigation was carried out in La Salle parish in adjoining areas. One part of the survey had to do with the determination of the number of barrels of brine being produced per day in the Tullos–Urania–Georgetown oil field, how much water from each lease, how much oil produced with each unit production of water and the ownership of the lease.

The other part of the survey had to do with determining the actual biological condition of the stream receiving this oil field brine. Combining both groups of data has made it possible to draw up what the writer considers to be a series of reasonable orders covering the amounts of brine that can be released from the total number of leases in the area.

The Caddo-Pine Island survey was conducted to determine whether or not the large number of leases in this field were being operated within the provisions of the Stream Control Commission's "Rules Governing Disposal of Waste Oil, Oil Field Brine, and any Other Wastes Resulting from the Drilling for, Production of, or Transportation of Oil, Gas or Sulphur". It was found that in many instances that much work was needed to clean up the leases and change the oil-water separation method so that serious oil waste pollution might be avoided. These corrective measures are being carried out in the field at the present time. The help that has been forthcoming from the Pollution Abatement Committee of Mid-Continent Oil and Gas Association in bringing about the clean up program has been very much appreciated.

Stream Surveys

In order not to be repetitious, not much more will be said about the chemical and biological survey of Little River except to say that it was a cooperative project and that without it no effective orders could have been written controlling brine discharges from the oil fields bordering Little River.

A survey of the upper Calcasieu has been completed and the information gathered has been of great help in deciding whether or not charges should have been preferred against the paper mill. The survey was comprehensive, covered both vertebrate and invertebrate studies, chemical analyses and flow measurements. Such information adds greatly to our understanding of our state's waters.

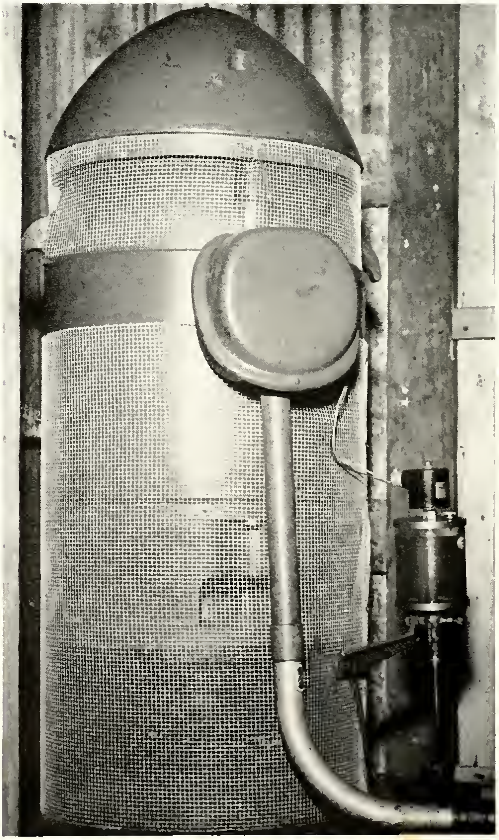
Chemical analyses of samples taken from two points on the Mississippi River, one above and one below the industrial area have been carried out for the past year. This information is invaluable in determining the effects of the wastes from the area on the river and also indicates what shape the river is in when it comes to Louisiana.

Plans for the Future

One of our top priority proposals is to extend the Calcasieu River Survey down to cover the area from above Lake Charles all the way down to the Gulf. Items of information to be gathered will include the effects of temperature barriers on fish movements, the effects of Lake Charles area waste disposal on the ecology of the lower Calcasieu, the ecological condition of the various areas of Big Lake and other similar pieces of information.

It is contemplated that a thorough study be made of the International Paper Company's Wham Impounding Basin, a 7.5 square mile area located south of the town of Bastrop which receives waste from the company's Louisiana and Bastrop mills. The writer believes that this impounding basin is unique, that there is nothing else like it in the country. Much is to be gained by studying the waste in the basin, the rate of stabilization, the average retention time of waste in the basin and in seeking answers to other such questions.

Much work has been done in the division's biological laboratories on determining the toxicity



Vertical propeller pump, 4,000 gallons per minute, at Greenwood Sugar Mill, Thidodaux. —*(Photo by Dupre)*

Two-mile long canal to carry water to impounding area pump at Southdown Sugar Mill, Houma. (Webb Studio Photo)

of pure chemicals and combination of chemicals to fish and other aquatic animals and invertebrates. This work is very important, and it is hoped that it can be continued. The importance of knowing the toxic action of these chemicals on fish life cannot be overemphasized because such knowledge gained in the laboratory gives at least some idea of the effect that the chemicals might have in our lakes and streams and will allow us to give proper interpretation to chemical analyses of wastes and waters from streams receiving these wastes.

A specific toxicity problem will be worked on in the coming years and that is the study of the effect that the various kinds of oil field brines have on waters receiving such brines. Little is known of the cumulative effects of such discharges on either the fish in such waters or on the silts and sands that go to make up the water bottoms. Because we have 350 oil and gas fields in the state this research problem is considered to be a most important one.

One change in the organizational set up of the division is the recommendation to extend the state coverage offered by our field waste disposal inspectors. As can be seen by studying the map, it is proposed that the state be divided into seven areas and that a waste disposal inspector be located in each area. It is thought that this will provide complete but economical coverage that is essential for the efficient control of stream pollution.

Anyone interested in studying the organizational set-up of the division is referred to the Fourth Biennial Report of the Louisiana Wild Life and Fisheries covering the years 1951-52 and the January 1954 *Louisiana* CONSERVATIONIST. The biennial report also contains a detailed report on waste disposal problems as they were at that time.

* * *

Commercial Fresh and Saltwater Fisheries, Shrimp, Oysters, Fur and Hides, Shell, Sand, Gravel, Sport Fishing and Hunting

W. S. Werlla, Assistant Director and Revenue Supervisor

. . . more than all the rest.

The Louisiana Wild Life and Fisheries Commission, governed by a seven-man board and director, was activated December 10, 1952. Under this Board is the Revenue Division which issues all licenses, audits and collects all revenues, compiles the statistics, makes reports and keeps the Commission informed at all times as to the progress made in order that they may know and take such action as found necessary to supervise the numerous divisions under their jurisdiction.

In this 1952-53 Biennial Report we are not only reporting on the records and statistics for the biennial years of 1951-52 and 1952-53, but giving this information in most instances, for many prior years. Also you will find that satistics and records are brought up to include the annual year 1953 in addition to the fiscal year ending June 30, 1953. This is being done because it was thought necessary in order to show the great increase in revenues during the full year of 1953 compared with former years so that all concerned may know what our revenues will be for the next biennium.

There is an ever increasing demand for our biennial report not only from legislative bodies of other states, but corporations, schools, colleges, and etc. We are trying to give all information available from the beginning, up to the present time of this industry in Louisiana which has grown to be the greatest in the nation, possibly the entire world, in combined production and value.

This 'gator hide is being salted before taking to market.

Table No. 1
COMPARISON OF REVENUES
JANUARY THRU DEC. 1952 WITH JANUARY THRU DEC. 1953

					1953	
Type of Revenue		**Year 1952**		**Year 1953**	**Increase**	**Decrease**
Sev. Tax—Gravel	$	....		$ 325.80	$ 325.80	$
Sev. Tax—Sand		963.64		1,583.90	620.26	
Sev. Tax—Skins, Hides & Furs		30,052.96		26,039.51		4,013.45
Sev. Tax—Oyster Privilege		24,436.56		22,003.42		2,433.14
Sev. Tax—Shrimp		73,367.00		77,310.19	3,943.19	
Sev. Tax—Frogs		486.32		612.23	125.91	
Angling Lic.—New Orleans	$ 22,132.00	126,225.25	$ 46,287.00	240,329.26	114,104.01	
Angling Lic.—State Aud. Stat.	104,093.25		194,042.26			
Hunting Lic.—New Orleans	$ 17,655.00	339,877.49	$ 18,967.00	455,253.61**	115,376.12	
Hunting Lic.—State Aud. Stat.	179,501.49		197,858.11			
Hunting Lic.—Act 25*	142,721.00		238,428.50			
Hunting Club		535.00		1,175.00	640.00	
Commercial Fishermen, Bait Sellers		3,170.00		13,180.00	10,010.00	
Hoop Nets		5,730.00		11,005.00	5,275.00	
Fresh Water Commercial Seines		1,570.00		2,515.00	945.00	
Fresh Water Trammel Net		1,530.00		2,930.00	1,400.00	
Fresh Water Gill Nets		14,545.00		27,060.00	12,515.00	
Salt Water Fish Seines		440.00		520.00	60.80	
Salt Water Trammel Net		1,040.00		1,940.00	900.00	
Wholesale Fish Dealer		15,625.00		19,300.00	3,675.00	
Wholesale Dealer's Agent		940.00		1,400.00	460.00	
Retail Dealer		12,030.00		15,490.00	3,460.00	
Oyster Vessel Tonnage		1,176.50		2,043.50	867.00	
Salt Water Fish Vessel		320.00		405.00	85.00	
Salt Water Shrimp Trawl & Vessel		37,165.00		56,375.00	19,210.00	
Oyster Dredging		6,850.00		12,850.00	6,000.00	
Salt Water Shrimp Seines		....		100.00	100.00	
Salt Water Menhaden Seine & Vessel		3,625.00		6,200.00	2,575.00	
Salt Water Shrimp Freight		1,990.00		3,190.00	1,200.00	
Game Breeders License		450.00		320.00		130.00

COMPARISON OF REVENUES—Continued

					1953	
Type of Revenue		**Year 1952**		**Year 1953**	**Increase**	**Decrease**
Trappers License	$ 328.00	9,253.03	$ 266.00	8,661.63		591.40
Trappers Lic.—State Aud. Stat.	8,925.03		8,395.63			
Resident Fur Buyers		3,950.00		3,975.00	25.00	
Resident Fur Dealers		4,650.00		3,750.00		900.00
Non-Resident Fur Buyers		....		....		
Non-Resident Fur Dealer		300.00		300.00		
Bedding Ground		28,964.00		45,941.00	16,977.00	
Oyster Shop Resale		830.00		1,120.00	290.00	
Releasing Lien Fees		14.00		31.00	17.00	
Dept. Reports, Other Publications		5.50		....		5.50
Misc. Refunds from Tax Collectors		....		....		
Royalty from Shells		254,768.57		221,621.45**		33,147.12
TOTALS		$ 1,006,875.82		$ 1,286,856.50	$321,201.29	$ 41,220.61
TOTAL INCREASE	$279,980.68					
Royalties from Mineral Leases		$ 441,517.47		$ 493,106.58	$ 51,589.11	
GRAND TOTAL		$ 1,448,393.29		$ 1,779,963.08	$372,790.40	$ 41,220.61
OVER ALL INCREASE	$331,569.79					
MINERAL LEASES		$ 627,726.40	No mineral leases dedicated to Conservation Fund for 1953			

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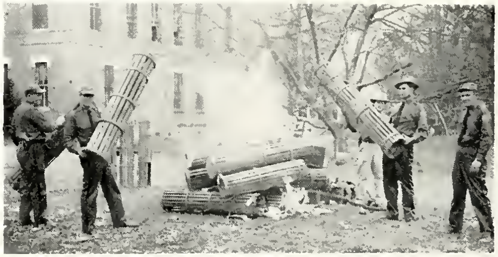
* Act 25 represents the additional $1.00 increase in Revenues from Resident Hunting Licenses last half of annual year 1952 and full year of 1953.

**$163,885.50 of the amount shown for Hunting Licenses does not go into the Conservation Fund. It is dedicated money, 75 per cent to the Enforcement Division and 25 per cent to Ducks Unlimited. $221,621.45 for shell is dedicated to Commercial Seafoods and Oyster Seed Grounds Divisions and does not go into Conservation Fund, making a total of $385,506.95 not shown on our estimated budget for succeeding fiscal years.



Confiscated fish traps make bonfire material for ranger crew, following disposal of a court case.

With reference to the above Table No. 1, Comparison of Revenues, Year 1952 with Year 1953, it is shown that there was an overall increase during the year 1953 over 1952 of 22.8 per cent. This is the greatest overall increase this department has ever shown in its history. These increases will be commented upon later in this report, however I want to call attention to the increase in angling licenses of 90.4 per cent and hunting licenses of 34 per cent. There is a decrease in shell revenue due to the fact that one of our largest users of clam shells secured all of its clam shells during 1953 from Galveston, Texas, they did not want to operate on their own leases in Louisiana because they desire to conserve their supply of shells in order to keep their plant in operation as long as possible.

In addition to the revenues as shown in Table No. 1, beginning with the year 1954 severance tax on sulphur from Garden Island Bay lease will bring an additional amount of revenue estimated at over $400,000 annually. All of these revenues are deposited in our Conservation Fund and are dedicated to protecting, conserving and propagating the resources under the Louisiana Wild Life and Fisheries Commission.

In other sections of this biennial report the chief of each division is making his report on progress made and his program for correction and expansion of his division. The detailed analysis of revenues following is made to show what monies will be available to carry out his programs.

COMMERCIAL FRESH AND SALTWATER FISH

Table No. 2

REVENUES DERIVED FROM DEALERS AND AGENTS COMMERCIAL FISHING AND SHRIMPING

	1951-52	1952-53
Wholesale Fish and Shrimp Dealers	$13,550.00	$20,775.00
Wholesale Fish and Shrimp Dealer's Agent	910.00	1,310.00
Retail Fish and Shrimp Dealer	10,595.00	16,710.00
TOTAL	$25,055.00	$38,795.00
	1952	**1953**
Wholesale Fish and Shrimp Dealer	$15,625.00	$19,300.00
Wholesale Fish and Shrimp Dealer's Agent	940.00	1,400.00
Retail Fish and Shrimp Dealer	12,030.00	15,490.00
TOTAL	$28,595.00	$36,190.00

Table No. 3

REVENUES FROM NETTING LICENSES, COMMERCIAL FRESH WATER FISH

	1951-52	1952-53
Commercial Fishermen	$ 3,260.00	$11,615.00
Hoop Nets	5,590.00	10,805.00
Seines	1,240.00	1,875.00
Trammel Nets	1,435.00	2,140.00
Gill Nets	14,595.00	23,320.00
TOTAL	$26,120.00	$49,755.00
	1952	**1953**
Commercial Fishermen	$ 3,170.00	$13,180.00
Hoop Nets	5,810.00	11,005.00
Seines	1,570.00	2,515.00
Trammel Nets	1,530.00	2,930.00
Gill Nets	14,545.00	27,060.00
TOTAL	$26,625.00	$56,690.00

Table No. 4

REVENUES FROM SALT WATER COMMERCIAL FISH NETTING

	1951-52	1952-53
Fish Seines	$ 390.00	$ 520.00
Fish Trammel Nets	800.00	2,020.00
TOTAL	$ 1,190.00	$ 2,540.00
	1952	**1953**
Fish Seines	$ 440.00	$ 520.00
Fish Trammel Nets	1,040.00	1,940.00
TOTAL	$ 1,480.00	$ 2,460.00

Table No. 5

NUMBER OF FISH NETTING LICENSES SOLD DURING THE YEAR 1953

Fresh Water Licenses	Number	Salt Water Licenses	Number
Trot Lines, Bait Sellers, Bait Seines, etc.	2,631	Seines, Menhaden	62
Hoop Nets	32,565	Seines, Fish	41
Seines, Fish	151	Trammel Nets	178
Trammel Nets	258		
Gill Nets	2,857		
TOTAL	38,462	TOTAL	281

* * *

Table No. 6

COMPARATIVE STATEMENT OF FRESH AND SALT WATER COMMERCIAL FISH PRODUCED BY LOUISIANA FISHERMEN

JULY 1ST, 1951 - JUNE 30TH, 1952 WITH JULY 1ST, 1952 - JUNE 30TH, 1953

Fresh Water Fisheries	July 1, 1951 - June 30, 1952		July 1, 1952 - June 30, 1953	
	Pounds	Value	Pounds	Value
Catfish	7,549,866	$ 2,113,962.48	5,631,218	$ 1,633,053.22
Gaspergou	2,432,422	340,539.08	1,316,616	197.492.40
Spoonbill Cat	231,183	27,741.96	469,325	70,398.75
Buffalo	3,502,533	560,405.28	2,866,589	458,654.24
Garfish	683,294	34,164.70	534,575	32,074.50
Miscellaneous	245,396	24,539.60	176,978	17,697.80
River Shrimp	35,950	17,975.00	34,946	17,473.00
Turtles	67,515	4,050.90	165.225	13,218.00
Crayfish	174,776	43,694.00	1,489,821	372,455.25
Frogs	33,057	13,222.80	126,852	57,083.40
TOTAL	14,955,992	$ 3,180,295.80	12,812,145	$ 2,869,600.56

Table No. 7

Salt Water Fisheries	July 1, 1951 - June 30, 1952		July 1, 1952 - June 30, 1953	
	Pounds	Value	Pounds	Value
Sea Turtles ..	28.241	$ 1,694.46	19,486	$ 1.169.16
Speckled Trout	427,170	128,151.00	436,867	131,060.10
Red Fish	167,851	41,962.75	291,539	72,884.75
Sheephead	66,272	4,639.04	62,152	4,350.64
Flounders	76,546	19,136.50	200,668	50,167.00
Red Snapper	35,164	7,736.08	66.645	16,661.25
Mullets	744,766	44,685.96	467,754	32,742.78
Drum	228,734	11,436.70	252,710	15,162.60
Miscellaneous	175,916	17,591.60	393,283	43,261.13
Hard Shell Crabs	5,503,625	275,181.25	8,190,800	491,448.00
Soft Shell Crabs	125,807	37,742.10	277,347	88,751.04
Crab Meat	19,997	15,997.60	354,215	318,793.50
TOTAL	7,600,089	$ 605,955.04	11,013,466	$ 1,266,451.95
TOTAL POUNDS, TABLES No. 6 and No. 7	22,556,081	....	23,825,611	....
"Baby Green Turtles"	812,992	$ 67,722.23	1,760,229	$ 146,627.08
TOTAL SALT WATER FISHERIES VALUE		$ 673,677.27		$ 1,413,079.03
TOTAL VALUE, TABLES No. 6 and No. 7		$ 3,853,973.07		$ 4,282,679.59

The above tables from 2 to 7 inclusive are self-explanatory. The reason for showing some of these statistics for fiscal years, is in order not to have a break in our biennial reports as heretofore shown. The statistics, in some cases, for the annual years 1952 and 1953 are shown to bring our report up to the year 1954, also reporting the increases or decreases during the year 1953.

Ass't Attorney John McGee

Table No. 8

STATEMENT OF LICENSES SOLD BY PARISHES FOR THE YEAR 1953

EXPLANATION OF NUMBERED COLUMNS

Column Number	Type of Licenses
1	Commercial Fresh Water Hoop Nets (15 nets allowed to operate under each license)
2	Commercial Fresh Water Fish Seines
3	Commercial Fish Producer
4	Commercial Fresh Water Trammel Nets
5	Commercial Fresh Water Fish Gill Nets
5-A	Salt Water Trammel Nets and Seines
6	Wholesale Dealer
7	Wholesale Dealer's Agent
8	Retail Dealer

Parish	1	2	3	4	5	5-A	Total Netting	Per Cent Each Parish	6	7	8	Total
Acadia	21	3	31	5	19		79	.010	6	5	55	145
Allen	13	1	2	3	1		20	.002	0	0	17	37
Ascension	27	0	19	0	9		55	.007	4	0	28	87
Assumption	29	2	106	2	8		147	.018	7	20	16	190
Avoyelles	70	3	34	8	99		214	.026	13	1	55	283
Beauregard	13	0	21	1	31		66	.008	1	0	22	89
Bienville	13	0	13	7	78		111	.013	1	0	15	127
Bossier	15	0	9	1	41		66	.008	0	0	25	91
Caddo	71	2	44	7	225		349	.042	5	0	122	476
Calcasieu	61	1	138	14	68		282	.034	2	1	102	387
Caldwell	37	1	38	1	39		116	.014	4	0	2	122
Cameron	0	1	21	0	2	16	40	.005	5	2	12	59
Catahoula	164	32	37	27	172		432	.052	8	12	3	455
Claiborne	0	0	0	0	1		1	....	1	0	14	16
Concordia	64	2	31	4	93		194	.023	3	0	10	207
DeSoto	11	0	11	0	15		37	.004	0	0	18	55
East Baton Rouge	24	6	14	0	25		69	.008	11	0	164	244
East Carroll	31	7	35	14	86		173	.021	4	0	19	196
East Feliciana	2	0	0	0	0		2	....	0	0	8	10
Evangeline	50	0	11	10	1		72	.009	0	0	26	98
Franklin	67	12	12	12	124		227	.027	3	5	14	249
Grant	17	0	12	0	25		54	.007	0	0	9	63
Iberia	37	2	13	0	1	2	55	.007	9	3	59	126
Iberville	138	0	39	0	7		184	.022	13	5	18	236
Jackson	2	0	8	0	4		14	.002	0	0	17	31
Jefferson	2	0	73	1	1	18	95	.011	24	7	101	226
Jefferson Davis	22	4	45	0	27		98	.012	3	0	26	127
Lafayette	5	4	12	0	0		21	.003	7	0	69	97
Lafourche	2	0	131	0	5	7	145	.019	32	10	56	227
LaSalle	82	12	33	4	236		367	.044	3	3	6	379
Lincoln	0	0	2	0	3		5	.001	0	0	11	16
Livingston	14	0	4	0	7		25	.003	1	0	25	51
Madison	15	5	10	3	56		89	.011	1	0	17	107
Morehouse	40	2	12	7	44		105	.013	0	0	17	122
Natchitoches	56	3	28	13	330		430	.052	2	2	31	464
Orleans	1	3	84	3	9	57	157	.019	43	7	995	1202
Ouachita	70	6	55	20	156		307	.036	9	1	57	374
Plaquemines	22	0	16	0	0	24	62	.008	3	3	6	75
Pointe Coupee	34	6	27	8	52		127	.020	1	0	41	169
Rapides	70	6	27	27	191		321	.039	13	3	99	436
Red River	15	1	6	3	45		70	.008	0	0	6	76
Richland	52	3	23	6	35		119	.014	1	0	20	140
Sabine	13	0	22	2	8		45	.005	1	0	10	56
St. Bernard	1	0	25	0	0	24	50	.006	8	8	5	71
St. Charles	2	0	123	0	26		151	.018	4	4	35	194
St. Helena	0	0	0	0	0		0	....	0	0	0	...
St. James	4	1	6	0	2		13	.002	2	0	33	48
St. John	6	0	28	0	36		70	.008	2	0	37	108
St. Landry	103	5	71	12	49		243	.030	8	3	70	324
St. Martin	125	1	86	3	29		244	.030	3	13	16	276
St. Mary	201	8	554	2	15	7	787	.095	19	15	75	896
St. Tammany	15	0	75	0	5	18	113	.013	4	0	43	160
Tangipahoa	10	0	73	1	2		86	.010	10	0	64	160
Tensas	26	3	2	8	92		131	.016	1	0	9	141
Terrebonne	4	0	85	0	1	45	135	.016	71	12	60	278
Union	61	0	23	7	58		149	.018	2	0	12	163
Vermilion	6	0	14	0	1	2	23	.001	3	0	38	64
Vernon	7	0	48	1	5		61	.007	0	0	29	90
Washington	15	0	24	0	2		41	.005	1	0	42	84
Webster	30	0	18	3	83		134	.016	0	0	21	155
West Baton Rouge	12	1	4	0	9		26	.003	0	0	10	36
West Carroll	32	1	15	7	60		115	.014	1	0	13	129
West Feliciana	8	1	1	0	1		11	.001	1	0	4	16
Winn	11	0	8	0	12		31	.004	0	0	12	43
TOTAL	2,171	151	2,591	258	2,867	220	8,261	100%	377	144	3,061	11,870

In Table No. 8 for the first time in the history of this department we are reporting the number of Fresh and Salt Water Nets, Dealers and Agents, by parish. This is being done in order to show the number and types in use in each parish of the state. You will note that this table shows the per cent of salt and freshwater netting in each parish, if it is desired to know pounds or value of commercial fish in a parish you can figure the percentage by referring to tables Nos. 6 and 7.

Table 8-A

SALT WATER NETTING AND COMERCIAL FISHING LICENSES SOLD BY PARISHES HAVING SALT AND OR BRACKISH WATER

Parish	Number	Percent
Cameron	16	.02
Iberia	9	.01
Jefferson	91	.10
Lafourche	138	.15
Orleans	141	.15
Plaquemines	40	.04
St. Bernard	49	.05
St. Charles	41	.04
St. John	9	.01
St. Mary	192	.20
St. Tammany	43	.04
Tangipahoa	14	.02
Terrebonne	130	.14
Vermilion	6	.01
TOTAL	919	100%

The above table number 8-A shows the percentage of saltwater nets and commercial fishermen taking saltwater fish in the parishes having salt and or brackish water. If the pounds or value of saltwater fish, as a total or by species is wanted, the per cent, shown above of the fish or value shown in table number 7 of this report, will give same.

There are other parishes in this state that show salt-water netting licenses purchased; however, such licensed persons have to come to a parish that has salt or brackish water to catch saltwater fish. They cannot be caught in freshwater.

Some of the 100,000,000 pounds of shrimp caught in Louisiana in 1953.

Table 8-A-1

FRESH WATER NETTING AND COMMERCIAL FISHERMEN LICENSES SOLD BY PARISHES

Parish	Number	Percent
Acadia	79	.011
Allen	20	.002
Ascension	55	.007
Assumption	147	.020
Avoyelles	214	.020
Beauregard	66	.009
Bienville	111	.015
Bossier	66	.009
Caddo	349	.048
Calcasieu	282	.038
Caldwell	116	.016
Cameron	24	.003
Catahoula	432	.059
Claiborne	1	-0-
Concordia	194	.026
DeSoto	37	.005
E. Baton Rouge	69	.009
E. Carroll	173	.024
E. Feliciana	2	-0-
Evangeline	72	.010
Franklin	227	.031
Grant	54	.007
Iberia	46	.006
Iberville	184	.025
Jackson	14	.002
Jefferson	4	.001
Jefferson Davis	98	.013
Lafayette	21	.003
Lafourche	7	.001
LaSalle	367	.050
Lincoln	5	.001
Livingston	25	.003
Madison	89	.012
Morehouse	105	.014
Natchitoches	430	.059
Orleans	16	.002
Ouachita	307	.042
Plaquemines	22	.003
Pointe Coupee	127	.017
Rapides	321	.044
Red River	70	.010
Richland	119	.016
Sabine	45	.006
St. Bernard	1	-0-
St. Charles	110	.015
St. Helena	-0-	-0-
St. James	13	.002
St. John	61	.008
St. Landry	243	.033
St. Martin	244	.033
St. Mary	595	.081
St. Tammany	70	.010
Tangipahoa	72	.011
Tensas	131	.018
Terrebonne	5	.001
Union	149	.020
Vermilion	17	.002
Vernon	61	.008
Washington	41	.006
Webster	134	.018
W. Baton Rouge	26	.004
W. Carroll	115	.016
W. Feliciana	11	.002
Winn	31	.004
	7,342	100%

The above Table 8-A-1 shows the number and percentage of freshwater netting and commercial fishing licenses sold in each parish of the state. To arrive at the number of pounds or value of the fish by species or otherwise the percentages shown in this table number 8-A-1 applied to table number six in this report will give the desired result.

Menhaden Fisheries

Within the past three or four years the above industry has shown a tremendous growth in the waters of the Gulf of Mexico. The production of meal and oil from these fish possibly equals or exceeds all other areas in the nation.

The taking of these fish in Louisiana waters are by vessels from 90 to 135 feet in length with a purse seine one-quarter of a mile long, 50 feet in depth, size of seine mesh is 3/4 inch bar and 1½ inches stretched. Some of the factories operating these vessels use a plane to spot these schools of fish in the waters and radio the location to the vessels which proceed to that area, and with the assistance of two motor-driven "purse boats" surround these fish with the quarter mile seine, a strike boat operated with oars holds up the back of the seine, when fish are surrounded seine is closed by drawing the bottom of the seine together, the large vessel with suction equipment transfers the fish from the purse seine to the hold of the vessel. When the hold of vessel is full it proceeds to its factory for processing.

Table No. 9

MENHADEN PRODUCTION BY UNITS OF 1,000 FISH PER UNIT

	TOTAL PRODUCTION				ESTIMATED UNITS TAKEN IN LOUISIANA WATERS			
Company	1951 Units	1952 Units	1953 Units	TOTAL UNITS	1951	1952	1953	TOTAL
Mississippi:								
Wallace M. Quinn, Fishy	66,542	76,747	24,218	167,507	49,907	57,560	21,796	129,263
The Fish Co.	......	79,603	19,355	98,958	......	79,603	19,355	98,958
Santos & Robinson	......	95,762	29,824	125,586	......	71,822	22,368	94,190
Tuna Inc.	29,030	18,425	13,806	61,261	21,773	13,819	11,735	47,327
TOTAL	95,572	270,537	87,203	453,312	71,680	222,804	75,254	369,738
Texas:								
Port Arthur Men Pro.	17,016	38,039	48,503	103,558	12,762	28,529	36,377	77,668
Quinn Men Fisheries	......	41,535	51,089	92,624	......	31,151	38,317	69,468
TOTAL	17,016	79,574	99,592	196,182	12,762	59,680	74,694	147,136
Louisiana:								
Empire Men Co., Inc.	139,715	141,011	143,351	424,077	139,715	141,011	143,351	424,077
The Quinn Men Fishy	75,677	63,555	53,086	192,318	75,677	63,555	53,086	192,318
La. Menhaden Co.	48,375	142,002	113,847	304,224	47,408	136,322	102,462	286,192
Gulf Menhaden Co.	54,216	78,732	161,504	294,452	54,216	78,732	161,504	294,452
TOTAL	317,983	425,300	471,788	1,215,071	317,016	419,620	460,403	1,197,039
GRAND TOTALS	430,571	775,411	658,583	1,864,565	401,458	702,104	610,351	1,713,913

Table No. 9—Continued

	Paid Fisherman $3.50 Per Unit	Processed Value $12 Per Unit	Oil Unit 45%	Meal Unit 55%	Weight 666 Lbs. Per Unit
Mississippi:					
Wallace M. Quinn, Fishy	$ 586,274.50	$ 2,010,084.00	2,010,084	23,420,980	111,559,662
The Fish Company	346,353.00	1,187,496.00	1,187,496	13,854,120	65,906,028
Santos & Robinson	439,551.00	1,507,032.00	1,507,032	17,582,040	83,640,276
Tuna Incorporated	214,413.50	735,132.00	735,132	8,576,540	40,799,826
TOTAL	$ 1,586,592.00	$ 5,439,744.00	5,439,744	63,433,680	301,905,792
Texas:					
Port Arthur Menhaden Products	$ 362,153.00	$ 1,242,696.00	1,242,696	14,198,120	68,969,628
Quinn Menhaden Fisheries	324,184.00	1,111,488.00	1,111,488	12,967,360	61,687,584
TOTAL	$ 686,637.00	$ 2,354,184.00	2,354,184	27,465,480	130,657,212
Louisiana:					
Empire Menhaden Co., Inc.	$ 1,184,269.50	$ 5,088,924.00	5,088,924	59,370,780	193,635,282
The Quinn Menhaden Fishery	673,113.00	2,307,816.00	2,307,816	26,924,520	128,083,788
Louisiana Menhaden Company	1,064,784.00	3,650,688.00	3,650,688	42,591,360	202,613,184
Gulf Menhaden Co.	1,030,582.00	3,533,124.00	3,533,424	41,223,280	196,400,484
TOTAL	$ 4,252,748.50	$ 14,580,852.00	14,580,852	170,009,940	720,732,738
GRAND TOTALS	$ 6,525,977.50	$ 22,374,780.00	22,374,780	261,009,100	1,153,295,742

Fur and Hides

We cannot give figures for the fiscal year 1953-54 because they will not be available until about May, 1954. The fur industry is one of our major problems because the take in fur has decreased from a 10 million dollar to a three and one-half million dollar value within the last five years. Comments on possible cause of decrease and proposed program for remedy will be found in this biennial under the Fur and Refuge Division.

Table No. 10

COMPARATIVE TAKES OF FUR ANIMALS IN LOUISIANA

	Average Number Per Year for 5 Years 1940-41—1944-45	Average Approximate Price at Point of Severance for 5 Years 1940-41—1944-45	Value of Skins to Producer
Muskrat	5,117,117	$1.17	$ 5,987,026.89
Nutria	268	.20	53.60
Mink	135,086	1.02	543,015.72
Raccoon	180,091	1.36	244,923.76
Opossum	98,969	.35	34,639.15
Otter	1,841	6.10	11,230.10
Skunk	18,581	.45	362.80
Fox	5,120	.65	3,328.00
Cat	481	.43	206.83
Miscellaneous	1,404	.50	702.00
TOTAL	5,558,961		$ 6,825,518.85
Alligators	6,869		
	4 Years 1945-46—1948-49		
Muskrat	6,277,443	$ 1.28	$ 8,035,127.01
Nutria	20,428	3.63	74,153.64
Mink	141,572	10.75	1,521,899.00
Raccoon	165,555	1.18	195,354.90
Opossum	55,789	.58	32,357.62
Otter	3,125	15.63	195,359.37
Skunk	4,903	.68	3,334.04
Fox	2,681	.50	1,340.50
Cat	526	.50	263.00
Wolf	2	.50	1.00
Miscellaneous	382	.50	191.00
TOTAL	6,672,406		$10,059,381.11
Alligators	31,209		
	4 Years 1949-50—1952-53		
Muskrat	1,732,924	$ 1.07	$ 1,854,228.68
Nutria	71,226	2.91	207,267.66
Mink	129,315	10.31	1,333,237.65
Raccoon	82,560	.44	145,304.28
Opossum	18,450	.21	3,874.50
Otter	4,204	10.55	44,352.20
Skunk	838	.29	243.02
Fox	759	.28	212.52
Cat	50	.49	24.50
Miscellaneous	55	.18	9.90
TOTAL	2,040,381		$ 3,588,754.91
Alligators	28,751		395,326.00
GRAND TOTAL			$ 3,984,080.91

Some families spend long winter evenings preparing nets for their men at sea.

Table No. 11

NUMBER OF FUR LICENSES SOLD

	1946-47	1947-48	1948-49	1949-50	1950-51	1951-52	1952-53
Resident Fur Buyer	352	330	246	215	232	207	155
Resident Fur Dealer	45	42	10	35	37	36	30
Non-Resident Fur Buyer	7	7	3	0	1	0	0
Non-Resident Fur Dealer	2	4	1	1	2	1	1
Trappers	12,258	9,908	8,905	7,109	7,732	6,141	1,328

Table No. 12

OYSTER AND WATER BOTTOMS

Calendar Years	Total Acre Area of Good Bottoms Susceptible to Culture	Average Acres per year under lease. (2 Calendar Years)	Total Barrels—Oyster Production, Average per year (2 years)
1897	....	.....	295,135
1903	....	2,821	472,191
1910 and 11	171,962	17,033	661,094
1915 and 16	471,962	20,034	727,820
1924 and 25	477,000	20,205	786,898
1934 and 35	500,000	10,250	823,817
1942 and 43	500,000	17,321	1,128,412
1944 and 45	500,000	18,963	631,366
1946 and 1947 thru 1950-51 (fiscal years)	1,000,000	30,874	624,415
1951 and 52	1,000,000	36,277	467,074
1953 (annual)	1,000,000	11,532	885,717

*Fiscal Year

Table No. 13

NUMBER OF DREDGE AND TONNAGE BOATS

Fiscal Year	Dredge Boats	Tonnage Boats
1951-52	162	178
1952-53	305	298
1953-54	200	385

The annual oyster production from 1910 to date is available, however, in order to condense the above tables we are only reporting the average for certain periods. The oyster industry, as in the fur industry, has declined since 1944 due to various causes which is reported on in this biennial by the Chief of the Oyster and Water Bottoms Division. It is shown that for the year 1953 the production was nearly double that of the fiscal year 1951-52. This increase in production was due in part to filing and collection of tax for prior years. The average production from 1946 through 1953 should be around 625,000 barrels.

Table No. 14

Year	Oyster Shells Cubic Yards	Estimated Amount of Severance Tax	Estimated Value to Producer
1936 thru 1941 (Average per yr.—6 year period)	820,992	$ 32,839.68	$1,641,984.00
1942 thru 1946 (Average per yr.—5 year period)	1,298,733	51,949.32	2,597,466.00
1947 thru 1951 (Average per yr.—5 year period)	1,246,257	49,850.28	2,804,078.25
1951	1,816,512	123,718.93	5,449,536.00
1952	1,642,995	113,117.25	1,928,985.00
1953	584,366	62,054.00	1,753,098.00

Year	Clam Shells Cubic Yards	Estimated Amount of Severance Tax	Estimated Value to Producer
1936 thru 1941 (Average per yr.—6 year period)	183,944	$ 9,197.20	$ 367,888.00
1942 thru 1946 (Average per yr.—5 year period)	638,383	31,919.15	1,276,766.00
1947 thru 1951 (Average per yr.—5 year period)	1,014,014	50,700.70	2,281,531.50
1951	1,813,414	123,225.01	5,440,242.00
1952	2,054,926	141,651.32	6,164,778.00
1953	1,506,632	159,567.45	4,519,896.00

The decrease in 1953 in the production of clam shells was commented upon in the second paragraph of this report.

Shell production increases or decreases varies with demand.

One of the larger shrimpers (more than 50 feet) heads for "outside" waters despite squall signs in the sky.

Shrimp

Table No. 15

TOTAL BARRELS OF VARIOUS TYPES OF PROCESSED SHRIMP MARKETED DURING THE PAST SEVEN YEARS 1946-1952 AND ONE YEAR 1953 AND VALUE TO THE PRODUCER

	Total Per Year	Average 1946-1952	Per Cent	1953	Per Cent	Value to Producer 1953
Whole	373,003.0	53,286.1	14	50,661.7	12	$
Headless	1,255,704.6	179,386.4	46	250,330.3	57	
Canned	642,193.0	91,741.9	23	91,548.1	21	
Dried	296,711.1	42,387.3	11	27,019.1	6	
Cooked and Peeled	173,009.3	24,715.6	6	17,779.8	4	
	2,740,621.0	391,517.3	100	437,340.5	100	$ 28,000,000.00

The above, Table No. 15, shows the production of shrimp as processed by wholesalers. Comparing the seven-year average, 1946 through 1952, with the year 1953, it shows an increase of 45,823.2 barrels or 9,622,872 pounds for the year 1953. It is of interest to note the change in the marketing of this product. Headless shrimp shows a percentage increase of 11 per cent; whole, two per cent decrease; canned, two per cent decrease; dried, five per cent decrease, and cooked and peeled, two per cent decrease.

The majority of the size shrimp used for processing into the different marketing product would be as follows:

Processed Product	No. of Heads on Shrimp to the Pound
Whole (Heads on)	30 to 40 count
Headless	Up to 25 count
Canned	40 count up
Dried	65 count up
Cooked and Peeled	45 to 50 count

Table No. 16

SHRIMP PRODUCTION PROCESSED IN EACH AREA FOR THE YEARS 1952 AND 1953

1952 Area Production	Whole	Headless	Canned	Dried	Cooked and Peeled	Total Barrels	Per Cent 1952
La. Shrimp Processed in Mississippi	......	12,167.6	20,303.5	...	.	32,471.1	8
French Market	35,259.2	......	......	....	......	35,259.2	9
New Orleans Area, St. Bernard and Plaquemines Parish	......	12,875.6	18,102.0	107.		31,084.6	7
Lafourche Parish	74.	48,370.6	925.2	799.6	205.9	50,375.3	13
Terrebonne Parish	650.8	54,382.3	37,445.7	31,408.8	18,292.5	142,180.1	36
Jefferson Parish	482.5	23,322.1	16,480.5	3,694.3	171.6	44,151.0	11
St. Mary and all other Parishes to Texas Line	202.1	60,216.3	1,673.8	58.	1,280.9	63,431.1	16
TOTAL	36,668.6	211,334.5	94,930.7	36,067.7	19,950.9	398,952.4	100

1953 Area Production	Whole	Headless	Canned	Dried	Cooked and Peeled	Total Barrels	Per Cent 1953
La. Shrimp Processed in Mississippi	......	3,872.0	21,814.0	......	.	25,686.0	6
French Market	46,126.7	94.9	......	......	......	46,221.6	11
New Orleans Area, St. Bernard and Plaquemines Parish	307.6	25,275.0	20,805.3	164.4	–0–	46,552.3	11
Lafourche Parish	1,147.0	65,436.0	3,596.9	......	96.2	70,276.1	16
Terrebonne Parish	755.9	47,037.6	28,797.0	22,045.4	15,877.3	114,513.2	26
Jefferson Parish	2,324.4	52,321.6	16,269.1	4,697.8	80.2	75,693.1	17
St. Mary and all other Parishes to Texas Line	......	56,296.3	263.8	112	1,726.1	58,398.2	13
TOTAL	50,661.6	250,333.4	91,546.1	27,019.6	17,779.8	437,340.5	100

Table No. 16 gives the finished product by areas in the State of Louisiana and Louisiana shrimp taken in Louisiana waters and processed in Mississippi. Comparing year 1952 with 1953 there is an increase in production for 1953 of 38,388.1 barrels or 8,071,501 pounds.

We are showing a breakdown in seven different areas where shrimp are processed and showing the percentage increase or decrease in each area for the finished product. The Mississippi area is for shrimp taken in Louisiana, principally Orleans, St. Bernard and Plaquemines parishes, for processing in Mississippi plants.

The French Market area (heads-on shrimp sold in New Orleans for bait and home consumption) secures its shrimp principally from Orleans, St. Bernard, Plaquemines and Jefferson parishes.

The New Orleans area, St. Bernard and Plaquemines parish area, covers shrimp taken in these parishes and processed in plants in and around New Orleans.

The Jefferson parish area shows production in that parish processed in Jefferson parish.

The other three areas, Lafourche, Terrebonne and St. Mary parish to the Texas line, are for shrimp taken and processed in those parishes. Wherever a plant processes shrimp taken in parishes other than the one in which it is located credit for production of such shrimp is given to the parish in which it was taken.

Again we wish to call attention to percentage increase or decrease in these seven different areas. This being shown in order that we may know what area was most productive in the different types of shrimp.

Steamed oysters are weighed in the can.

Table No. 17

MONTHLY AVERAGE SHRIMP PRODUCTION
SIX YEARS 1941-46, 1947-52, AND ONE YEAR 1953

	Six Year Monthly Barrel Average 1941-1946	Per Cent	Six Year Monthly Barrel Average 1947-1952	Per Cent	One Year Monthly Barrel Total 1953	Per Cent
January	52,312	10	19,048	5	17,983	4
February	34,691	7	18,221	4	9,223	2
March	19,001	4	13,558	4	10,736	2
April	12,591	3	17,552	5	25,078	6
May	21,958	4	36,263	9	61,356	14
June	37,996	8	28,804	8	52,445	12
July	29,907	6	11,847	3	25,032	6
August	19,603	4	45,479	12	46,882	11
September	60,210	12	17,835	13	46,457	11
October	66,999	13	61,076	16	71,768	16
November	74,775	15	44,559	12	39,999	9
December	68,312	14	34,998	9	30,381	7
TOTALS	498,832	100	379,260	100	437,340	100

Table No. 18

MONTHLY AVERAGE DRIED SHRIMP PRODUCTION
THREE YEARS 1950-52 AND ONE YEAR 1953

	3 Year Monthly Barrel Average 1950-52	Per Cent	1 Year Monthly Barrel Total 1953	Per Cent
January	3,061	7	4,337	16
February	2,428	6	533	2
March	746	2	135	0.5
April	421	1	306	1.5
May	1,575	4	3,041	11
June	2,571	6	1,634	6
July	161	0	754	3
August	3,200	8	2,789	10
September	3,572	9	1,843	7
October	8,773	21	2,825	10
November	8,152	20	5,975	22
December	6,452	16	2,848	11
TOTALS	41,112	100	27,020	100

Number of tons of shrimp meal 1953, 473 tons value $40,205.00.

Table No. 17 gives average monthly production for each six years from 1941 through 1952 and for the year 1953 by months. Note the percentage fluctuation during these periods. In the first part of the year, 1953, it appeared that we would have one of the poorest years in history, but it started to pick up in May when we experienced an unusual run of brown shrimp and continued to increase until we show the greatest production in 1953 in eight years.

Table No. 18 shows monthly average of dried shrimp for years 1950 through 1952 and 1953. The dried shrimp industry in Louisiana for many years consumed the major portion of the shrimp production, processing over 100,000 barrels. It has decreased annually, the year 1953 shows the lowest production in the history of Louisiana. This is not due to a decrease in shrimp but to the value of shrimp increasing due to quick freezing methods, etc. At this time the market value of dried shrimp cannot compete with shrimp processed otherwise.

A shrimp peeling machine in action. Replaces hand-pickers and first introduced in Louisiana five years ago.

Table No. 19

Name	20 feet and under	Over 20 feet thru 35 feet incl.	Over 35 feet thru 45 feet incl.	Over 45 feet	Total
Acadia	1	3	1	–0–	4
Calcasieu	25	20	10	3	58
Cameron	6	16	21	9	52
E. Baton Rouge	1	1	–0–	–0–	2
Iberia	8	33	16	7	64
Jefferson	97	321	139	31	588
Jefferson Davis.	2	1	2	–0–	5
Lafayette	1	3	–0–	3	9
Lafourche	6	94	161	121	382
Orleans	27	134	60	28	249
Plaquemines ...	8	156	94	5	263
St. Bernard	22	126	72	11	231
St. Charles	2	19	12	–0–	32
St. Landry	1	1	–0–	–0–	2
St. Mary	3	54	53	79	189
St. Tammany ..	5	12	4	8	29
Tangipahoa	1	5	1	–0–	7
Terrebonne	34	306	316	68	724
Vermilion	24	41	18	28	111
Washington ...	1	1	–0–	–0–	2
TOTAL	275	1,347	980	401	3,003

Name	20 feet and Under	21 feet thru 35 feet incl.	36 feet thru 45 feet incl.	Over 45 feet	Total
Mississippi	2	79	98	170	349
Alabama	...	14	34	32	80
Florida	...	...	1	12	13
Georgia	...	...	...	1	1
Rhode Island ...	...	...	...	1	1
Texas	17	16	23	40	96
TOTAL	19	109	156	256	540

Table No. 19 shows the number of vessels engaged in shrimping during the year in Louisiana waters as to length of vessel and parish in which the owner lives. Some of these vessels are registered in parishes not on the coast; however, they shrimp in the coastal waters. These shrimp vessels, especially the larger ones over 35 feet, may shrimp in the coastal waters of any or all of the areas, not necessarily in the area in which they are registered.

This eight months-old pet otter stands while his dog companion watches the act.

* * *

Table No. 20

SHRIMP PRODUCTION FOR 5 GULF STATES AND MEXICO
YEAR 1952 AND 10 MONTHS 1953

STATE	TOTAL		POUNDS	
	Year 1952	Per Cent	Jan. 1st through Oct. 31, 1953	Per Cent
Florida	42,340,172		37,223,736	
Alabama	3,465,630		3,280,200	
Mississippi	9,859,028		7,984,465	
Texas	* 63,072,719		53,672,443	
	188,737,549	50.2	102,160,844	49.9
Mexico	** 33,862,947	14.3	* 25,380,891	12.4
	152,600,496		127,541,735	
Louisiana	83,779,920	35.5	77,063,910	37.7
	236,380,416	100 %	204,605,645	100 %

Louisiana produced 41.4% of the total shrimp produced in the five Gulf States in 1952.
Louisiana produced 43.0% of the total shrimp produced in the five Gulf States during the first 10 months of 1953.
Louisiana produced 35.5% of the total shrimp produced in the five Gulf States and Mexico in 1952.
Louisiana produced 37.7% of the total shrimp produced in the five Gulf States and Mexico during the first 10 months in 1953.

*Comparing 10 months in 1953 only, due to being unable to get production figures for last two months from other states at this time.

**Shrimp imports from Mexico to the United States.

It is recognized that the shrimp fisheries in the United States will probably rank first in value of all other combined fisheries in the United States for the year 1953.

Table No. 21

SHRIMP PRODUCTION AND NUMBER OF TRAWLS AND OR SEINES

Calendar Year	No. Barrels Shrimp (210 lbs.)	No. of Seines	No. of Trawls Fiscal Year	No. of Trawls Calendar Year
1908	40,857	No Record	. . .	. . .
1913	50,000	131	. . .	. . .
1914	52,381	250	. . .	. . .
1915	57,143	268	. . .	. . .
1916	85,714	. . .	. . .	. . .
1917	57,143	?	. . .	1
1918	71,429	300	. . .	17
1919	76,190	. . .	. . .	. . .
1920	152,381	97	. . .	499
1921	163,012	135	. . .	983
1922	109,050	111	. . .	699
1923	153,749	128	. . .	1,021
1924	150,624	143	. . .	905
1925	154,722	180	. . .	1,010
1926	123,967	143	. . .	692
1927	150,896	120	. . .	913
1928	195,303	261	. . .	1,454
1929	210,033	125	. . .	1,486
1930	197,550	172	. . .	1,176
1931	178,815	126	. . .	1,131
1932	152,373	66	. . .	699
1933	166,058	67	. . .	1,045
1934	226,576	107	. . .	1,441
1935	252,981	125	. . .	1,433
1936	286,749	30	. . .	1,920
1937	362,942	35	. . .	2,313
1938	363,656	13	. . .	1,662
1939	395,050	26	. . .	1,621
1940	397,189	5	. . .	. . .
1941	554,354	5	3,028	. . .
1942	489,173	4	2,380	. . .
1943	441,445	4	2,101	. . .
1944	544,378	4	1,866	. . .
1945	495,994	4	2,373	. . .
1946	464,981	4	. . .	3,030
1947	365,617	4	. . .	3,200
1948	376,605	4	. . .	3,408
1949	376,040	4	. . .	3,310
1950	361,365	3	. . .	2,819
1951	396,980	0	. . .	2,248
1952	398,952	0	. . .	2,277
1953	437,340	10	. . .	3,543

Table No. 21 shows number of trawls, seines and barrels of shrimp produced in Louisiana from the year 1908 to date.

The increase in licensed shrimp vessels in 1953 over 1952 was 1,226. This increase does not necessarily mean that we had 1,266 new vessels engaged in this industry; probably we had the same number of vessels in 1952 because if newly built boats were put in the water they took the place of obsolete ones. The price and quantity of shrimp had a great bearing on the vessels in use besides other reasons that increased the license registration.

The catch per boat, when figured on a percentage basis, may appear smaller and some may contend that Louisiana has too many boats in operation for the amount of shrimp available, however; shrimp will come to the area that is more ideal as to inshore waters for protection and food. Louisiana is blessed with 950 miles of coast line which cannot be duplicated in any other waters in this world and while the catch per boat may be smaller the continuous increase in value offsets the smaller catches. In former years we had fewer boats making larger catches but they received as low as $3.50 per barrel but last year the record price paid the producer was $136 per barrel.

. . . and they line up to get licenses in the main office. All license sales increased, most of them by 94 per cent, in 1953.

Table No. 22

SHRIMP PROCESSED IN MISSISSIPPI TAKEN FROM LOUISIANA WATERS

1952	Whole	Headless	Canned	Dried	Cooked and Peeled	Total
January		1,000.5	3,494.0			4,494.5
February		......	3,322.5			3,322.5
March		495.5	935.5			1,431.0
April		260.0	395.0			655.0
May		347.0	866.0			1,213.0
June		338.0	1,428.5			1,767.1
July		......	......			......
August		542.0	1,991.5			2,533.5
September		1,404.5	2,271.5			3,676.0
October		2,060.5	3,108.0			5,168.5
November		3,812.0	933.0			4,745.0
December		1,907.0	1,558.0			3,465.0
TOTAL		12,167.6	20,303.5			32,471.1

SHRIMP PROCESSED IN MISSISSIPPI TAKEN FROM LOUISIANA WATERS

1953	Whole	Headless	Canned	Dried	Cooked and Peeled	Total
January		752.5	1,371.5			2,124.0
February		166.5	620.0			786.5
March		513.5	655.5			1,169.0
April		291.0	430.5			721.5
May		560.5	1,331.5			1,892.0
June		314.0	2,768.5			3,082.5
July		.....	......			......
August		598.0	2,140.5			2,738.5
September		476.0	2,388.0			2,864.0
October		200.0	4,266.5			4,466.5
November		.....	4,226.5			4,226.5
December		.....	1,615.0			1,615.0
TOTAL		3,872.0	21,814.0			25,686.0

Table No. 22—Continued

FRENCH MARKET AREA

1952	Whole	Headless	Canned	Dried	Cooked and Peeled	Total
January	1,164.6					1,164.6
February	8,010.1					8,010.1
March	3,892.0					3,892.0
April	1,067.1					1,067.1
May	2,021.0					2,021.0
June	4,945.7					4,915.7
July	1,656.7					1,656.7
August	3,231.3					3,231.3
September	1,766.5					1,766.5
October	3,557.6					3,557.6
November	1,383.3					1,383.3
December	2,563.3					2,563.3
TOTAL	35,259.2					35,259.2

FRENCH MARKET AREA

1953	Whole	Headless	Canned	Dried	Cooked and Peeled	Total
January	979.0	94.9				1,073.9
February	2,030.9					2,030.9
March	751.6					751.6
April	7,317.2					7,317.2
May	3,179.3					3,179.3
June	5,100.2					5,100.2
July	4,148.7					4,148.7
August	4,250.6					4,250.6
September	9,015.0					9,015.0
October	3,917.6					3,917.6
November	2,535.0					2,535.0
December	2,901.6					2,901.6
TOTAL	46,126.7	94.9				46,221.6

Table No. 22—Continued

NEW ORLEANS AREA

1952	Whole	Headless	Canned	Dried	Cooked and Peeled	Total
January		226.3	593.0			819.3
February		3,799.2	219.3			4,018.5
March		245.5		107.0		352.5
April		461.0	167.0			628.0
May		247.2	2,190.3			2,437.5
June		1,104.0	1,793.5			2,897.5
July		1,033.0	455.0			1,488.0
August		995.2	2,942.6			3,937.8
September		2,539.6	1,427.2			3,966.8
October		835.9	4,086.2			4,922.1
November		705.8	3,661.4			4,367.2
December		682.9	566.5			1,249.4
TOTAL		12,875.6	18,102.0	107.0		31,084.6

NEW ORLEANS AREA

1953	Whole	Headless	Canned	Dried	Cooked and Peeled	Total
January	24.6	327.0	92.5			444.1
February		152.0				152.0
March		304.9				304.9
April		431.1	329.5			760.6
May	283.0	3,045.0	3,879.6			7,207.6
June		3,207.9	2,500.5			5,708.4
July		3,053.7	63.5			3,117.2
August		2,583.6	2,983.5			5,567.1
September		3,280.1	3,498.5	63.0		6,841.6
October		3,710.5	5,481.0	4.7		9,196.2
November		3,970.6	942.2	96.7		5,009.5
December		1,208.6	1,034.5			2,243.1
TOTAL	307.6	25,275.0	20,805.3	164.4		46,552.3

Table No. 22—Continued

LAFOURCHE PARISH AREA

1952	Whole	Headless	Canned	Dried	Cooked and Peeled	Total
January		2,207.8	240.0		66.7	2,514.5
February		5,103.8	129.6		90.0	5,323.4
March		549.2	24.0		49.2	622.4
April		3,843.3	148.3			3,991.6
May		7,900.3				7,900.3
June		2,903.8	223.4	525.3		3,652.5
July	74.0	8,789.4				8,863.4
August		4,082.6	159.9	274.3		4,516.8
September		3,397.2				3,397.2
October		997.5				997.5
November		6,154.0				6,154.0
December		2,441.7				2,441.7
TOTAL	74.0	48,370.6	925.2	799.6	205.9	50,375.3

LAFOURCHE PARISH AREA

1953	Whole	Headless	Canned	Dried	Cooked and Peeled	Total
January		1,387.7			96.2	1,483.9
February	107.3	1,970.6	9.1			2,087.0
March		704.6	32.6			737.2
April		3,042.3				3,042.3
May	147.0	9,650.8				9,797.8
June		12,513.0				12,513.0
July	169.5	6,221.2				6,390.7
August	200.0	5,803.3				6,003.3
September		4,845.2				4,845.2
October		13,361.1				13,361.1
November		145.0	3,555.2			3,700.2
December	523.2	5,791.2				6,314.4
TOTAL	1,147.0	65,436.0	3,596.9		96.2	70,276.1

Table No. 22—Continued

TERREBONNE PARISH AREA

1952	Whole	Headless	Canned	Dried	Cooked and Peeled	Total
January		2,770.4	457.6	3,700.8	1,444.7	8,373.5
February	12.0	3,431.7	4,424.4	2,471.0	1,470.1	11,809.2
March	22.1	3,641.1	2,763.7	721.6	955.7	8,104.2
April	78.0	2,970.7	725.3	3.0	992.3	4,769.3
May	20.0	6,510.3	5,973.5	821.6	2,088.6	15,414.0
June	13.0	10,004.9	2,179.2	1,218.2	151.7	13,567.0
July	57.0	3,178.2	1,682.7	407.5		5,325.4
August	25.0	2,905.4	2,196.5	3,372.7	2,101.6	10,601.2
September	20.0	4,508.0	5,732.8	4,026.4	2,218.7	16,505.9
October	275.7	6,070.8	6,123.4	8,760.3	1,408.8	22,639.0
November	14.0	2,481.0	2,798.0	3,170.5	3,254.6	11,718.1
December	114.0	5,909.8	2,388.6	2,735.2	2,205.7	13,353.3
TOTAL	650.8	54,382.3	37,445.7	31,408.8	18,292.5	142,180.1

TERREBONNE PARISH AREA

1953	Whole	Headless	Canned	Dried	Cooked and Peeled	Total
January		1,585.2	1,231.4	3,568.6	970.7	7,355.9
February	25.0	931.6	142.2	510.2	131.3	1,740.3
March	52.0	768.8	293.6	63.8	248.7	1,426.9
April	118.0	2,287.9	1,026.1	105.0	779.6	4,316.6
May	3.3	8,235.6	4,596.1	2,748.2	2,598.3	18,181.5
June	383.8	4,041.5	3,287.1	951.9	2,041.7	10,706.0
July		4,852.1	2,106.6	752.2	214.3	7,925.2
August	2.3	5,843.3	3,533.8	2,768.6	3,285.5	15,433.5
September		3,887.2	3,716.4	1,724.5	1,127.9	10,456.0
October	151.0	7,661.2	4,587.0	1,968.9	2,187.2	16,555.3
November		4,811.5	3,781.6	4,713.1	1,202.9	14,509.1
December	20.5	2,131.7	495.1	2,170.4	1,089.2	5,906.9
TOTAL	755.9	47,037.6	28,797.0	22,045.4	15,877.3	114,513.2

Table No. 22—Continued

JEFFERSON PARISH AREA

1952	Whole	Headless	Canned	Dried	Cooked and Peeled	Total
January		1,212.4	793.0		55.6	2,061.0
February		1,636.8	870.5	340.0	75.0	2,922.3
March		151.2	20.0	95.3	41.0	307.5
April		1,384.8	261.6			1,646.4
May		3,067.9	992.5	430.8		4,491.2
June		2,502.2	2,304.2	1,330.7		6,137.1
July		1,452.4	410.0	1.0		1,863.4
August		2,131.5	2,723.5	164.7		5,019.7
September		3,823.2	2,333.6	360.8		6,517.6
October		2,568.4	3,572.2	120.5		6,261.1
November	482.5	2,455.0	1,496.5	464.5		4,898.5
December		936.2	703.0	386.0		2,025.2
TOTAL	482.5	23,322.0	16,480.5	3,694.3	171.6	44,151.0

JEFFERSON PARISH AREA

1953	Whole	Headless	Canned	Dried	Cooked and Peeled	Total
January	60.0	2,717.2	92.5	758.0	80.2	3,707.9
February		1,514.4	7.6	23.0		1,545.0
March		2,625.6	27.2	71.7		2,724.5
April		2,597.0	987.2	201.0		3,785.2
May	1,132.8	9,060.0	4,128.5	278.3		14,599.6
June		6,599.0	1,610.5	640.5		8,850.0
July	332.3	2,026.0	50.0	2.0		2,410.3
August		6,391.0	1,954.0	20.3		8,365.3
September		5,303.9	2,570.3	9.5		7,883.7
October		5,863.9	3,823.3	851.0		10,538.2
November	232.0	5,286.8	175.0	1,165.0		6,858.8
December	567.3	2,336.8	843.0	677.5		4,424.6
TOTAL	2,324.4	52,321.6	16,269.1	4,697.8	80.2	75,693.1

Table No. 22—Continued

ST. MARY PARISH AND ALL OTHER PARISHES TO TEXAS LINE

1952	Whole	Headless	Canned	Dried	Cooked and Peeled	Total
January		3,623.9	250.0		149.9	4,023.8
February		1,356.6	135.0		250.7	1,742.3
March		424.8	25.0	58.0	165.6	673.4
April		3,414.1	154.5		46.8	3,615.4
May		2,531.3	454.3			2,985.6
June		7,169.2	488.5			7,657.7
July	179.1	5,911.1				6,090.2
August		5,322.1	166.5		139.4	5,628.0
September		10,505.3				10,505.3
October		9,657.2			300.0	9,957.2
November	23.0	2,789.3			92.0	2,904.3
December		7,511.4			136.5	7,647.9
TOTAL	202.1	60,216.3	1,673.8	58.0	1,280.9	63,431.1

ST. MARY PARISH AND ALL OTHER PARISHES TO TEXAS LINE

1953	Whole	Headless	Canned	Dried	Cooked and Peeled	Total
January		1,604.8		10.0	178.3	1,793.1
February		836.0	9.5		35.9	881.4
March		3,534.5	34.0		53.9	3,622.4
April		4,929.2			234.8	5,164.0
May		6,444.9		14.0		6,458.9
June		6,222.8	220.3	42.0		6,485.1
July		913.9			125.8	1,039.7
August		4,304.3			220.0	4,524.3
September		4,348.7		46.0	156.0	4,550.7
October		13,258.8			474.7	13,733.5
November		2,992.9			176.6	3,169.5
December		6,905.5			70.1	6,975.6
TOTAL		56,296.3	263.8	112.0	1,726.1	58,398.2

Table No. 22 compares shrimp production of 1952 with 1953 in each of the seven areas by months as processed in each type marketed.

Shrimp has been a very controversial subject in Louisiana since the beginning of this industry. As above stated the seven different areas in Louisiana have never been in complete agreement as to laws, seasons, etc. This lengthy report is being submitted so that we may show the take of shrimp as nearly exactly as possible and try to get these seven different areas to make a decision which, as near as possible, will be of equal benefit to all.

After careful study of table No. 22 by areas you can arrive at an accurate figure as to monthly production, size and species of shrimp and the percentage of take by areas each month of the year. You will note that the appearance of large quantities of brown shrimp in the summer months only appeared in certain areas, that some areas actually show a decrease in production in the year 1953 over 1952, that some areas had their largest catch in different months than in former years, etc.

We wish to call attention to the fact that the statistics and reports shown above are accurate. They are based upon taxes paid and reports made, as prescribed by law, and not as an estimate, these statistics are the minimum production. We know that, for instance, in shrimp and fish production some of these taxes and tonnage must get away to bordering states because Louisiana is located in the exact center of the five Gulf States and the distance from the Louisiana border to processing plants in adjoining states is shorter. Our program calls for a set up that will prevent this condition as much as possible.

Numerous reports are made by different agencies in Louisiana and throughout the United States based on spot checks, estimates, hearsay, etc. No one appears to know the actual facts. As our facts are based upon the minimum production, it is safe to estimate that from 10 to 15 per cent could be added to our statistics in order to report actual figures.

Angling Licenses

Table No. 23

NUMBER OF ANGLING LICENSES SOLD

YEAR 1939 to 1953 INCLUSIVE

'ear	Total	Angling Resident $1.00	Angling Non-Resident $5.00	Angling Non-Resident 7 Day Trip $2.00
939	27,096	12,649	14,447	**
940	31,014	16,140	14,874	**
941	52,695	38,080	*14,615	
942	41,661	30,608	*11,053	
943	36,112	29,492	3,332	3,288
944	33,239	25,755	3,743	3,741
945	35,002	27,000	4,088	3,914
946	52,909	42,621	5,808	4,480
947	61,055	59,353	4,702	**...
948	66,797	63,657	3,140	**...
949	82,942	72,397	5,970	4,575
950	83,068	72,044	5,872	5,152
951	89,337	76,516	6,477	6,344
952	102,715	89,159	6,207	7,349
953	195,568	169,758	11,818	13,992

* Includes both Annual and 7-day trip.

* No 7-day trip license issued during these years.

Table No. 23 estimates number of licenses sold during he year 1953, based on 90.4% increase in revenues.

Table No. 24

ANGLING REVENUES — FISCAL YEARS

935-36	$ 10,451.41
936-37	17,807.75
937-38	25,918.28
938-39	27,179.57
939-40	26,436.28
940-41	47,454.01
942-43	53,203.28
944-45	48,398.47
946-47	89,014.64
948-49	92,299.32
949-50	104,548.43
950-51	107,771.72
951-52	120,519.54
952-53	193,481.82
alendar Year	
952	$126,225.25
953	240,329.26

Table No. 24 shows angling license revenues or calendar year 1953 increased $114,104.01 or 0.4 per cent over the calendar year 1952.

Resident persons under 16 or over 60 years f age, personnel of the armed services and resilent persons fishing with pole and line, hand line, tc. not using artifical bait are not required to ay for an angling license in this state. All perons using a rod and reel or artifical bait are equired to pay for an angling license. Number nd kind of angling licenses sold in each parish as been printed, a copy of this report may be ecured from this office.

During the year 1953 there were over 195,568 angling licenses sold in this state. There were approximately three persons, such as above stated, to every one licensed person, who was not required to pay for a license. Considering this fact the number of persons fishing for sport and home onsumption were 782,272.

Fish is the most common food in this state, a conservative estimate would be 50 pounds of fish to each person annually, making a total of 39,128,400 pounds of fish taken by this method. An average value of 30 cents per pound would mean a total value in fish of $11,738,520 or approximately $60 worth of fish for each license sold. This meaning a revenue to the state of two mills on the assessed value of the state's property.

In Tables No. 6 and 7 we show commercial fresh and saltwater fish taken during fiscal year 1952-53 a total of 23,825,611 pounds of fish valued at $4,136,100. This would show that sport fishermen and persons fishing for home consumption harvested 15,302,789 more pounds at a greater value of $7,603,420.00 than the commercial fishermen harvested.

Hunting Licenses

Table No. 25

NUMBER OF HUNTING LICENSES SOLD

SEASON 1939-40 TO 1952-53, INCLUSIVE

Year	Total	Hunting Resident $1.00	Hunting Non-Resident $25.00	Hunting Non-Resident 4 Day Trip $5.00
1939-40	98,167	93,587	1,335	3,245
1940-41	116,653	115,336	166	1,151
1941-42	146,648	144,349	495	1,804
1942-43	119,543	118,300	163	1,080
1943-44	94,609	93,334	181	1,094
1944-45	124,485	121,767	407	2,311
1945-46	162,872	160,795	409	1,681
1946-47	170,396	169,652	744	*...
1947-48	176,715	175,482	1,233	*...
1948-49	222,201	221,702	499	*...
1949-50	235,447	234,964	483	1,140
1950-51	235,472	234,195	137	1,140
1951-52	235,855	234,177	192	1,486
1952-53	209,665	207,428	169	2,068
Calendar Year				
1953	280,951			

* No 4-day trip licenses issued during those years.

Table No. 25, shows an increase of 71,268 Hunting Licenses sold for calendar year 1953.

Table No. 26

HUNTING LICENSE REVENUES

1935-36	$ 42,797.35
1936-37	68,185.57
1937-38	71,305.13
1938-39	90,555.38
1939-40	96,717.43
1940-41	115,941.28
1941-42	144,767.29
1942-43	129,113.56
1944-45	124,690.62
1946-47	*334,970.17
1948-49	*220,435.11
1949-50	231,719.86
1950-51	226,543.77
1951-52	229,233.37
1952-53	*395,882.92
Calendar Year	
1952	339,877.49
1953	455,253.61

* Hunting Licenses $2.00 during these years in place of $1.00.

Table No. 26, Revenue from Hunting Licenses for the calendar year 1953, shows an increase of $115,276 over calendar year 1952 or 34 per cent, it may even show a greater increase when all of the returns are in from the sheriffs in the parishes who sell these Licenses.

Persons in the armed services and resident persons over 60 years of age are exempt from the payment of hunting license fees. A report of the number and kind of licenses sold by parish has been published, copy of same may be secured from this office upon request.

ESTIMATED VALUATION OF THE INDUSTRY, VALUE TO PRODUCER AND PERSONS PARTICIPATING UNDER THE LOUISIANA WILD LIFE & FISHERIES COMMISSION

Fresh Water Commercial Fisheries

	Value of Equipment	Value to Producer	Number of Persons Employed
Netting and Tackle	$ 3,336,180.00		13,400
Wholesale, Retail Dealers and Dealer's Agent	9,598,000.00		5,042
TOTAL	$ 12,934,180.00	$ 2,869,600.56	18,442
Salt Water Commercial Fisheries			
Netting and Tackle	$ 290,700.00		1,470
Wholesale, Retail Dealers and Dealer's Agent	5,198,000.00		2,644
Fish Vessels	400,000.00		60
TOTAL	$ 5,888,700.00	$ 1,413,079.03	4,174
Menhaden Fisheries			
Plants and Equipment	$ 7,500,000.00		720
Vessels	6,522,000.00		1,488
Netting	1,240,000.00		(Included with Vessels)
TOTAL	$ 15,262,000.00	$ 5,661,456.00	2,208
Furs			
Dealers and Buyers	$ 5,250,000.00		400
Traps	1,600,000.00		8,000
Boats, Pirogues, Upkeep of Land, Camps and Equipment	27,552,000.00		
TOTAL	$ 34,402,000.00	$ 3,984,080.91	8,400

Oysters

	Value of Equipment and Land		
Dealers and Plants	$ 5,500,000.00		3,115
Dredge Boats	2,400,000.00		1,000
Tonnage Boats	3,080,000.00		770
Leased Grounds	33,225,600.00		
TOTAL	$ 44,205,600.00	$ 3,125,000.00	4,885

Sulphur

Plant	$ 14,000,000.00		
Barges	900,000.00		300
Boats	60,000.00		
TOTAL	*$ 14,960,000.00	$ 10,000,000.00	300

* This applies to sulphur plant at Garden Island Bay lease, that is located on land under supervision of Louisiana Wild Life and Fisheries Commission, and not for entire state.

Shell

Plants, Barges and Equipment	$ 59,500,000.00	$ 6,000,000.00	1,500

Shrimp

	Value of Equipment	Value to Producer	Number of Persons Employed
Wholesale Dealers, Plants and Equipment	$ 11,835,000.00		26,300
Trawl Vessels and Equipment	63,774,000.00		9,743
Trawls, Yearly	3,188,700.00		
Shrimp Nets	5,000.00		
TOTAL	$ 78,802,700.00	$ 28,000,000.00	36,073
GRAND TOTAL	$ 265,955,180.00	$ 61,053,216.50	* 75,982

* Allowing three dependents to each employed person would be 303,928 dependent upon this commercial industry for a living.

Angling

Value of Equipment	Value of Fish	Number of Persons Employed
$ 39,113,600.00	$ 11,738,520.00	782,272

The above valuation and number of persons participating are as explained after Table No. 24.

Hunting

	Value of Equipment	Number of Persons Employed
	$ 36,691,375.00	209,665
GRAND TOTAL—Hunting, Angling, Non-Commercial Fishing	$ 75,804,975.00	

The above valuation of equipment for hunting is arrived at by allowing each person purchasing a hunting license $175.00 for equipment.

No attempt is being made to value the game killed.

The grand total number of persons engaged cannot be estimated because the majority of persons both hunt and fish and persons in the commercial industries also purchase a hunting and fishing license.

GRAND TOTAL—Commercial and Non-Commercial....... $ 341,443,655.00 $ 72,407,655.59

The Louisiana Legislature makes the laws and policies in accordance with the wishes of the people interested in this over 341 million dollar industry. The Board of Commissioners of the Louisiana Wild Life and Fisheries Commission see that such laws and regulations are carried out to the best interest of all concerned. The industries are so closely interwoven that the operations of each have a direct bearing upon the operation of others. The Board of Commissioners must govern in a manner so that, regardless of the size of one industry, it shall not operate to the detriment of the other.

The department could not operate successfully on the revenues paid by commercial and non-commercial industries. The revenue from oil royalties and in 1954 from sulphur makes the Louisiana Wild Life and Fisheries Commission self-supporting, and the only department in the State of Louisinaa so operating. The industries pay their own way, they receive no financial aid by price support or subsidies from the United States Government or the state. They ask that the monies they pay into the department fund be spent in the interest of developing, expanding and conserving their interests.

The accounting section keeps tab on the incoming and outgoing monies in budget operations.

Chief Accountant R. J. Goebel, Jr.

LOUISIANA WILD LIFE & FISHERIES COMMISSION

FINANCIAL STATEMENTS FOR THE FISCAL YEAR

1952-1953 AND 1953-1954

1. Operating Account
2. Pittman-Robertson (Federal Projects) Fund Account
3. Oyster Seed Ground Account
4. Commercial Seafood Division Account
5. Fur and Refuge Account
6. Marsh Island Improvement Fund Account
7. Rockefeller Refuge Fund Account
8. Dedicated Funds (Act 22 of 1946) Public Shooting Grounds
9. Hyacinth Control, Act 554 of 1952
10. Civil Fees for Law Violations
11. Revenue Collections for the account of Louisiana State Treasury

OPERATING ACCOUNT

Means of Financing:	Actual 1952-53	Estimated 1953-54
State Appropriation	$1,008,500.00	$1,008,500.00
Board of Liquidation	....	53,200.00
Act 25 of 1952—Enforcement Division share of ½ of Resident Hunting License Collections	122,250.00	127,500.00
Dingell-Johnson Federal Projects:		
Balance Surplus (State Share) 6-30-53		13,489.92
Federal Allotment 75%		40,469.76
State Appropriation 25%	18,583.00	10,000.00
Federal Allotment	55,749.00	30,000.00
	$1,205,082.00	$1,283,159.68

Analysis of Expenditures by Units:

DIVISION OF ADMINISTRATION:	Actual 1952-53	Estimated 1953-54
Class of Expenditures:		
Salaries	$ 82,675.98	$ 105,540.00
Contractual Services	33,842.02	34,995.00
Traveling Expenses	8,934.09	16,500.00
Materials and Supplies	11,956.33	10,800.00
Special Current Charges	4,503.17	6,000.00
Equipment—Capital Outlay	5,584.48	....
Grand Total of Expenditures	$ 147,496.07	$ 173,835.00

DIVISION OF EDUCATION AND PUBLICITY:		
Class of Expenditures:		
Salaries	$ 28,617.63	$ 43,260.00
Contractual Services	50,191.61	52,000.00
Traveling Expenses	1,626.07	1,540.00
Materials and Supplies	2,113.03	1,740.00
Special Current Charges	1,612.04	2,500.00
Equipment—Capital Outlay	2,149.17	2,500.00
Grand Total of Expenditures	$ 86,309.55	$ 103,540.00

DIVISION OF RESEARCH AND STATISTICS:		
Class of Expenditures:		
Salaries	$ 37,727.75	$ 44,500.00
Contractual Services	3,160.13	2,500.00
Traveling Expenses	8,908.12	7,300.00
Materials and Supplies	4,787.25	3,500.00
Special Current Charges	1,839.43	2,000.00
Equipment—Capital Outlay	513.70	....
Grand Total of Expenditures	$ 56,936.38	$ 59,800.00

DIVISION OF ENFORCEMENT:		
Class of Expenditures:		
Salaries	$ 356,405.18	$ 424,710.00
Contractual Services	26,968.73	15,090.00
Traveling Expenses	158,765.52	150,290.00
Materials and Supplies	35,033.02	31,000.00
Special Current Charges	18,693.24	22,000.00
Equipment—Capital Outlay	11,614.72	5,000.00
Grand Total of Expenditures	$ 607,480.41	$ 648,090.00

DIVISION OF OYSTER AND WATER BOTTOMS:		
Class of Expenditures:		
Salaries	$ 31,666.19	$ 34,740.00
Contractual Services	9,951.21	8,600.00
Traveling Expenses	6,060.21	4,000.00
Materials and Supplies	7,305.50	6,000.00
Special Current Charges	14,032.09	15,000.00
Equipment—Capital Outlay	1,086.95	....
Grand Total of Expenditures	$ 70,102.15	$ 68,340.00

DIVISION OF FISH AND GAME:		
Class of Expenditures:		
Salaries	$ 94,938.64	$ 71,115.00
Contractual Services	18,957.46	14,000.00
Traveling Expenses	14,218.87	16,000.00
Materials and Supplies	25,235.63	29,980.00
Special Current Charges	3,703.47	4,000.00
Equipment—Capital Outlay	5,348.03	500.00
Grand Total of Expenditures	$ 162,402.10	$ 135,595.00

DIVISION OF DINGELL-JOHNSON:	Actual 1952-53	Estimated 1953-54
Class of Expenditures:		
Salaries	$ 4,075.00	$ 25,000.00
Contractual Services	120.30	2,000.00
Traveling Expenses	1,076.24	8,000.00
Material and Supplies	7,590.21	20,000.00
Special Current Charges	232.50	950.00
Equipment—Capital Outlay	7,278.05	30,000.00
Major Repairs	....	8,000.00
Grand Total of Expenditures	$ 20,372.30	$ 93,950.00
Grand Total of Expenditures Operating Account	$1,151,098.96	$1,283,150.00

PITTMAN-ROBERTSON FUND ACCOUNT

Means of Financing:

Balance Surplus (State share) 6-30-52	$ 45,007.79	$..........
Federal Allotment 75%	135,023.37	....
Balance Surplus (State share) 6-30-53	....	100,961.88
Federal Allotment 75%	....	302,885.64
State Appropriation 25%	130,000.00	83,500.00
Federal Allotment 75%	390,000.00	250,500.00
	$ 700,031.16	$ 737,847.52

Class of Expenditures:

Salaries	$ 133,793.41	$ 180,000.00
Contractual Services	11,207.35	40,000.00
Traveling Expenses	10,688.86	40,000.00
Material and Supplies	49,469.60	74,000.00
Special Current Charges	6,514.91	15,500.00
Equipment—Capital Outlay	46,378.46	100,000.00
Major Repairs	....	50,000.00
Land and Construction	....	75,000.00
Reserve for Future Allocations	....	75,000.00
	$ 258,052.59	$ 649,500.00

OYSTER SEED GROUND ACCOUNT

Means of Financing:

Dedicated Revenue to the establishment of Oyster Seed Grounds and to the planting, propagation, cultivating, policing, preservation and distribution of oysters as set forth in Act 533 of 1950, Section 458 ½ Tax on shells taken from State owned Waterbottoms (less part due and transferred to Commercial Seafood Division)	$ 65,838.07
	$ 65,838.07
Cash Balance Fiscal year ending June 30, 1952	$ 89,994.93
Revenues Fiscal year ending June 30, 1953	65,838.07
	$ 155,833.00
Expenditures Fiscal year ending June 30, 1953	121,212.20
	$ 34,620.80
Estimated Revenues Fiscal year ending June 30, 1954	$ 115,000.00
	$ 149,620.80
Estimated Expenditures Fiscal year ending June 30, 1954	$ 118,500.00
Unencumbered Balance June 30, 1954 estimated	$ 31,120.80

Analysis of Expenditures:	**Actual**	**Estimated**
Class of Expenditures:	**1952-53**	**1953-54**
Salaries	$ 43,023.33	$ 45,000.00
Contractual Services	27,271.05	30,000.00
Traveling Expenses	6,971.34	6,000.00
Material and Supplies	30,271.24	25,000.00
Special Current Charges	2,046.70	2,500.00
Equipment—Capital Outlay	11,628.54	10,000.00
Grand Total of Expenditures	$ 121,212.20	$ 118,500.00

COMMERCIAL SEAFOOD DIVISION ACCOUNT

Means of Financing:

Dedicated Revenues to the Administrative and Enforcement of commercial seafood Laws as set forth in Act 533 of 1950, Section 458 ½ Tax on shells taken from state owned water bottoms	$ 159,136.34
	$ 159,136.34
Cash Balance Fiscal year ending June 30, 1952	$ 167,192.59
Revenues Fiscal year ending June 30, 1953	159,136.34
	$ 326,328.93
Expenditures Fiscal year ending June 30, 1953	$ 164,322.80
	$ 162,006.13
Estimated Revenues Fiscal year ending June 30, 1954	$ 115,000.00
	$ 277,006.13
Estimated Expenditures Fiscal year ending June 30, 1954	$ 229,500.00
Unencumbered Balance June 30, 1954 estimated	$ 47,506.13

Analysis of Expenditures:	**Actual**	**Estimated**
Class of Expenditures:	**1952-53**	**1953-54**
Salaries	$ 52,286.51	$ 90,000.00
Contractual Services	16,358.11	25,000.00
Traveling Expenses	17,362.53	20,000.00
Material and Supplies	12,254.78	20,000.00
Special Current Charges	2,361.31	4,500.00
Equipment—Capital Outlay	63,699.56	70,000.00
Grand Total of Expenditures	$ 164,322.80	$ 229,500.00

FUR AND REFUGE ACCOUNT

Means of Financing:	Actual 1952-53	Estimated 1953-54
Dedicated Revenues to the propagation and protection of preserves:		
Sale of Furs	$ 201.86	$ 15,000.00
Sale of Alligator Skins	146.57	1,000.00
Rental of Unimproved Lands-Pasture	1,944.00	2,500.00
Sale of Boat Nutria	8,050.00	....
Insurance Recover Trappers Camp #2 Marsh Island	2,479.70	....
	$ 12,822.13	$ 18,500.00
Cash Balance Fiscal year ending June 30, 1952	$ 258,438.55	
Revenues Fiscal year ending June 30, 1953	12,822.13	
	$ 271,260.68	
Expenditures Fiscal year ending June 30, 1953	$ 108,228.93	
	$ 163,031.75	
Estimated Revenues Fiscal year ending June 30, 1954	$ 18,500.00	
Estimated Expenditures Fiscal year ending June 30, 1954	$ 181,531.00	
Unencumbered Balance June 30, 1954, estimated	$	

Analysis of Expenditures:

Class of Expenditures:		
Salaries	$ 57,494.44	$ 99,980.00
Contractual Services	3,427.63	10,000.00
Traveling Expenses	8,505.98	10,000.00
Material and Supplies	22,498.39	45,551.00
Special Current Charges	2,621.89	5,000.00
Equipment—Capital Outlay	6,080.60	11,000.00
Major Repairs	7,600.00	....
Grand Total of Expenditures	$ 108,228.93	$ 181,531.00

MARSH ISLAND IMPROVEMENT FUND ACCOUNT

Means of Financing:	Actual 1952-53	Estimated 1953-54
Funds received from the Russell Sage-Marsh Island Lease for improvements to Marsh Island Refuge:		
Cash Balance Fiscal year ending June 30, 1952	$ 37,173.23	
Sale of Diesel Engines	17,879.84	
Sale of Boat Hawk	3,479.10	
Additional Insurance Recovery Boat Muskrat	577.66	
	$ 59,109.83	
Expenditures Fiscal year ending June 30, 1953	$ 44,824.36	
Unencumbered Balance June 30, 1953	$ 14,285.47	
Estimated Expenditures Fiscal year ending June 30, 1954	14,285.47	
Unencumbered Balance June 30, 1954, estimated	....	

Analysis of Expenditures:

Class of Expenditures:		
Salaries	$ 28,224.38	$ 9,060.62
Contractual Services	1,873.74	247.23
Traveling Expenses	3,875.10	1,454.74
Material and Supplies	5,374.78	2,182.13
Special Current Charges	1,448.68	151.65
Equipment—Capital Outlay	1,740.87	....
Damage Claim Insurance Recovery	2,286.81	1,189.10
Grand Total of Expenditures	$ 44,824.36	$ 14,285.47

ROCKEFELLER REFUGE FUND ACCOUNT

Means of Financing:	Actual 1952-53	Estimated 1953-54
Funds received from Rockefeller Lease for improvements to Rockefeller Refuge		
Cash Balance Fiscal year ending June 30, 1952	$ 205,018.65	
	$ 205,018.65	
Expenditures Fiscal year ending June 30, 1953	$ 30,433.66	
	$ 174,584.99	
Estimated Expenditures Fiscal year ending June 30, 1954	$ 174,584.99	

Analysis of Expenditures:

Class of Expenditures:		
Salaries	$ 15,820.66	$ 28,000.00
Contractual Services	1,800.02	5,000.00
Traveling Expenses	2,403.48	7,000.00
Material and Supplies	4,292.29	13,584.99
Special Current Charges	629.40	1,000.00
Equipment—Capital Outlay	5,487.81	120,000.00
Grand Total of Expenditures	$ 30,433.66	$ 174,584.99

DEDICATED FUNDS ACT 22 OF 1946

Means of Financing:	Actual 1952-53	Estimated 1953-54
Proceeds One-Half Resident Hunting Licenses alloted as follows:		
50% for purchase, construction and maintenance of Public Shooting Grounds		
Cash Balance Fiscal year ending June 30, 1952	$ 162,177.08	
Revenues — Hunting privilege fees Pass - a - Loutre - Public Shooting Grounds fiscal year ending June 30, 1954	390.00	
	$ 162,567.08	
Expenditures Fiscal year ending June 30, 1954	525.00	
Unencumbered Balance June 30, 1954, estimated	$ 162,042.08	
Analysis of Expenditures:		
Class of Expenditures:		
Contractual Services		$ 25.00
Materials and Supplies		500.00
Grand Total of Expenditures		$ 525.00

WATER HYACINTH CONTROL ACT 554 OF 1952

Means of Financing:		
Special State Appropriation	$ 50,000.00	$ 50,000.00
Analysis of Expenditures:		
Class of Expenditures:		
Salaries	$ 20,363.36	$ 29,000.00
Contractual Services	1,170.82	2,000.00
Traveling Expenses	7,006.91	7,000.00
Material and Supplies	10,116.80	10,000.00
Special Current Charges	1,216.85	1,500.00
Equipment—Capital Outlay	6,342.51	500.00
Grand Total of Expenditures	$ 46,217.25	$ 50,000.00

SPECIAL FUND — OPERATING ACCOUNT

Act 25 of 1952 — Section 104

½ of Resident Hunting License collections

75¢ to statewide Enforcement

25¢ to Migratory Bird Propagation

REVENUES Actual 1952-1953	REVENUES Estimated 1953-1954	EXPENDITURES Actual 1952-1953	EXPENDITURES Estimated 1953-1954
$204,507.00	$200,000.00	$173,380.50	$231,126.50

CIVIL FEES FOR LAW VIOLATIONS

Fees Collected and Transmitted to the Following Parish School Boards During Fiscal Year 1952-1953

Acadia Parish	$ 237.50
Allen Parish	112.50
Ascension Parish	237.50
Assumption Parish	337.50
Avoyelles Parish	361.94
Beauregard Parish	225.00
Bienville Parish	12.22
Bossier Parish	512.50
Caddo Parish	137.50
Calcasieu Parish	275.00
Caldwell Parish	200.00
Cameron Parish	225.00
Catahoula Parish	207.50
Concordia Parish	25.00
DeSoto Parish	87.50
East Baton Rouge Parish	400.00
East Feliciana Parish	50.00
Evangeline Parish	431.00
Franklin Parish	75.00
Grant Parish	287.50
Iberia Parish	550.00
Iberville Parish	424.70
Jackson Parish	25.00
Jefferson Parish	475.00
Jefferson Davis Parish	37.50
Lafayette Parish	162.50
Lafourche Parish	300.00
LaSalle Parish	220.00
Livingston Parish	423.15
Morehouse Parish	522.50
Natchitoches Parish	1,560.55
Ouachita Parish	422.69
Plaquemines Parish	560.00
Pointe Coupee Parish	1,838.00
Rapides Parish	1,020.00
Red River Parish	162.50
Richland Parish	345.00
St. Bernard Parish	450.00
St. Charles Parish	1,425.00
St. Helena Parish	49.75
St. James Parish	787.50
St. John the Baptist Parish	775.00
St. Landry Parish	777.50
St. Martin Parish	625.00
St. Mary Parish	150.00
St. Tammany Parish	749.00
Sabine Parish	37.50
Tangipahoa Parish	637.50
Terrebonne Parish	1,025.00
Union Parish	100.00
Vermilion Parish	350.00
Vernon Parish	462.50
Washington Parish	300.00
Webster Parish	87.50
West Feliciana Parish	187.50
Winn Parish	225.00
	$22,688.00

Revenue Collections for the account of the Louisiana State Treasurey:	**Actual 1952-1953**	**Estimated 1953-1954**
Severance Tax		
Gravel	$	$ 350.00
Sand	1,415.52	1,600.00
Skins, Hides and Furs	26,779.26	26,000.00
Oyster Privilege	21,118.72	22,000.00
Shrimp	70,447.19	78,000.00
Frogs	583.84	600.00
Licenses		
Angling Licenses	41,888.00	48,000.00
Hunting Licenses	17,934.00	19,000.00
Hunting Club	600.00	1,200.00
Commercial Fishermen, Bait Sellers	11,615.00	14,000.00
Hoop Nets	10,805.00	11,300.00
Fresh Water Commercial Seine	1,875.00	2,600.00
Fresh Water Commercial Tram Net	2,140.00	3,300.00
Fresh Water Commercial Gill Net	23,320.00	27,500.00
Commercial Salt Water Fish Seine	520.00	520.00
Commercial Salt Water Fish Trammel Net	2,020.00	2,100.00
Wholesale Fish Dealers	20,775.00	21,000.00
Wholesale Fish Dealers Agent	1,310.00	1,500.00
Retail Dealers Fish and Seafood	16,710.00	17,000.00
Oyster Vessel Tonnage	1,382.00	2,300.00
Salt Water Fish Vessel	440.00	400.00
Salt Water Menhaden Vessel	2,550.00	3,250.00
Oyster Dredging	8,900.00	13,000.00
Salt Water Shrimp Trawl and Vessel	58,825.00	59,000.00
Salt Water Shrimp Seine	80.00	100.00
Salt Water Shrimp Seine Menhaden	2,700.00	3,250.00
Salt Water Shrimp Freight or Ice Boats	3,090.00	3,500.00
Breeders for Private Bird and Animal Preserves	300.00	320.00
Trappers	234.00	270.00
Resident Fur Buyers	3,875.00	3,975.00
Resident Fur Dealers	4,500.00	3,750.00
Non Resident Fur Dealers	300.00	300.00
Bedding Ground	41,532.00	46,000.00
Oyster Shop Resale Canning Steam Box	710.00	1,100.00
Releasing Lien Fees	23.00	35.00
Total Revenues Collected through New Orleans and Biloxi Office	$ 401,297.53	$ 438,120.00
Remitted by Sheriff's and State Land Office		
Angling Licenses	$ 151,593.82	$ 200,000.00
Hunting Licenses	171,458.92	190,000.00
Tarppers Licenses	7,774.36	8,000.00
Royalties from Mineral Leases Dedicated to Conservation (Act 29 of 1936) Oil	471,751.51	490,000.00
Sulphur	....	166,000.00
Total Remitted Sheriff's and State Land Office	$ 802,578.61	$1,054,000.00
GRAND TOTALS	$1,203,876.14	$1,492,120,00

. . . *to the end* (*Pass-a-Loutre*)